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제18회 대한물리의학회 추계학술대회 및 정기총회

최신 물리치료 접근법 및 물리치료 창업

일 시 2020. 11. 7(토) 13:00~17:00

대한물리의학회
Korean Society of Physical Medicine

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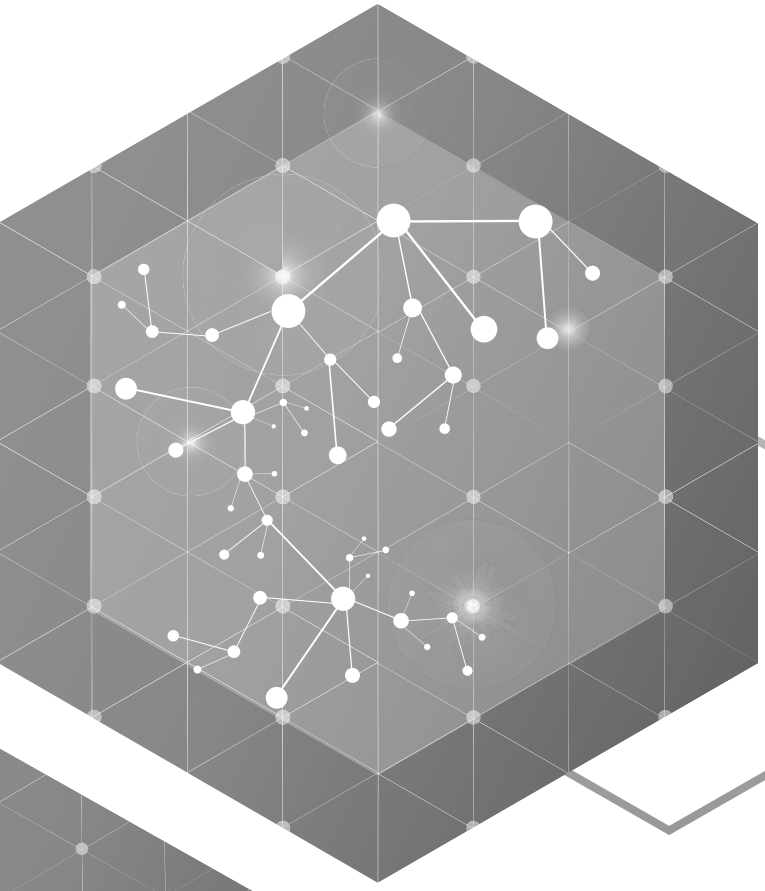

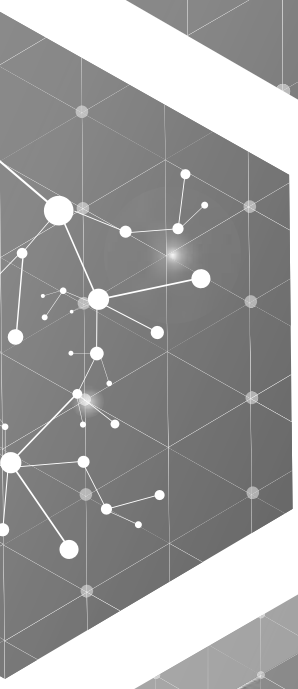

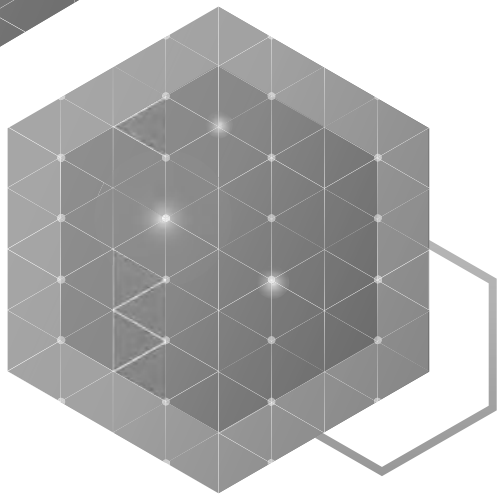

제18회 대한물리의학회 추계학술대회 및 정기총회

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제 18회 대한물리의학회 추계학술대회 및 정기총회 일정 및 세부사항

최신 물리치료 접근법 및 물리치료 창업

○ 일 시 : 2020년 11월 7일(토요일) (13:00~17:00)

○ 세부 일정표

시 간	프 로 그 램	진행 및 특강자	진행방법
13:00~13:10	**개회식 및 축사**	학회장, 충남도회장 배성수 명예회장	실시간 진행
	session 1. 최신 물리치료 접근법 및 물리치료 창업	좌장 : 김형동 (고려대)	온라인 실시간 발표 및 토론
13:10~13:30	**가상현실 및 증강현실을 활용한 치료접근**	이현민 (호남대)	
13:30~13:50	**가상현실(VR) 기반 전산화 재활시스템**	이상우 선임 / 김민정 연구소장 (인더텍)	
13:50~14:10	**물리치료사의 새로운 영역**	박철호 대표 (바트리움)	
14:10~14:30	**다양한 아이템을 활용한 기술창업**	이수경 (동의대)	
14:30~14:50	**휴식시간**		
	session 2. 물리치료 최신연구 및 연구윤리	좌장 : 이경순 (동주대)	온라인 실시간 발표 및 토론
14:50~15:30	**신진과학자 최신연구발표**	발표자 : 신진과학자	
15:30~15:50	**물리치료 연구윤리**	한동욱 (신라대)	
15:50~16:00	**휴식시간**		
16:00~16:20	**session 3. 포스터 전시 및 발표**		온라인 전시 실시간 토론
16:20~16:30	**시상식**	사회자, 회장 진행	실시간 진행
16:30~17:00	**정기총회 및 폐회식**	사회자, 회장 진행	실시간 진행

Contents

4. 초록

5. 포스터

개회사

친애하는 회원 여러분
펜데믹 시대에 4차 혁명을 준비하는 첫 시작을 회원여러분과 함께 할 수 있음에 감사드립니다.
코로나로 인한 의료위기가 도약의 주춧돌이 되길 응원합니다.

언텍트 학회의 첫 포문을 여는 오늘
낯설은 학회 진행에 넓은 이해와 양해 부탁드립니다.
'필수적 건강관리자' 곧 '물리치료사'
물리치료사의 전문적인 판단을 통한 원격 물리치료가 일반화되기 위한 준비를 회원여러분께서 인지할 때입니다.
이를 위한 환자 접근성, 치료의 효율성, 프로그램의 다양화 등 시행착오가 물리치료사의 역량 강화로 연결되도록 최선을 다하겠습니다.
그 외에도 '물리치료사법 제정' '전문물리치료의 제도화 도입' 등
물리치료사의 전문성 강화를 위한 공익성 필요를 대외적으로 알리는데 힘쓰겠습니다.

대한물리의학회 회원여러분
본 학회는 물리치료학문의 전문성과 권익을 위해 무한한 방법을 모색할 것이며
회원여러분의 물리치료로 모든 근간이 되도록 애쓰겠습니다.
건강이 최고의 인사인 요즘
회원여러분의 건강과 적극적인 참여를 바라겠습니다.
건강한 모습을 뵙기를 희망합니다.

2020년 11월 7일
대한물리의학회 학회장 유 경 태

특강 1

가상현실 및 증강현실을 활용한 치료접근 (ICT Technology in Rehabilitation)

/ 이현민


가상현실 및 증강현실을 활용한 치료접근
: ICT Technology in Rehabilitation
Introduction
Plans
호남대학교 이현민
호남대학교
L&H Labs
Life & health

1.


ICT Technology in Rehabilitation
Medical VR
Work Experience
R&D
L&H Labs
Life & health

2.

Work Experience

- 대구대학교 재활과학대학 신경과학교실 연구원/외래교수 (2003~2008)
- 한국국제대학교 물리치료학과 초빙교수 (2009)
- 호남대학교 보건과학대학 물리치료학과 (2010.03~2020.10 현재)

- 대한물리의학회 대외협력이사(2018.01~2020.10 현재)
- 대한물리치료학회 편집위원(2019.01~2020.10 현재)

- 광주전남발전연구원 인력사회분야 초빙연구원(2011~2013)
- 광주테크노파크 헬스케어로봇 실증센터 기획/자문위원(2019-)
- 국립재활원 재활로봇중개사업 자문위원(2013-2018)

- 정밀재활 빅데이터 센터 구축사업 기획위원(2018)
- 라이프케어로봇 실증사업 기획위원(2019)
- 행동인지기반 인공지능 헬스케어 서비스실증 사업 기획(2020)

5.

Medical VR

Diagnostic Imaging

Surgery

Neuropsychiatry

Rehabilitation

7.

영상진단학

의료영상진단에서 3D CG는 비침습적이며 2D로는 가시화가 불가능한 형태의 특징을 추출하는데 중요한 역할

- 3D가상 대장내시경(colonscopy)
- 3D가상 기관지경(bronchoscopy)
- 3D가상 이경(otoscopy)
- 3D가상 혈관내시경(vascular endoscopy)
- 3D가상 뇌실경(ventriculoscopy)

9.

외과학(수술, 수술기술교육, 훈련)

- Reznick 등은 Objective Structured Assessment of Technical Skill(OSATS)이라는 구조화된 수술평가법을 이용하여 동물을 이용한 수술 훈련과 인체 모형을 이용한 bench station을 가지고 훈련한 경우의 효과성에는 차이가 없다는 것을 제시
- 따라서 인체모형을 VR기술을 이용하여 모델화함으로써 기본적인 수술기법에 관한 교육훈련평가시스템이 개발

11.

신경정신의학

- VR은 뇌에 유사지각자극을 줌으로써 VR 공간에 존재하고 있는 듯한 감각을 생성하는 기술이므로, 이러한 가상공간을 정신병증의 특성에 맞게 구축하여 기존의 정신행동치료법에서는 곤란한 체험을 해당 공간 안에서 실시함으로써 치료효과를 얻을 수 있도록 하는 것이 기본원리

- 우울증, 신경증, 패닉장애, 고소공포증, 치매 등

15.

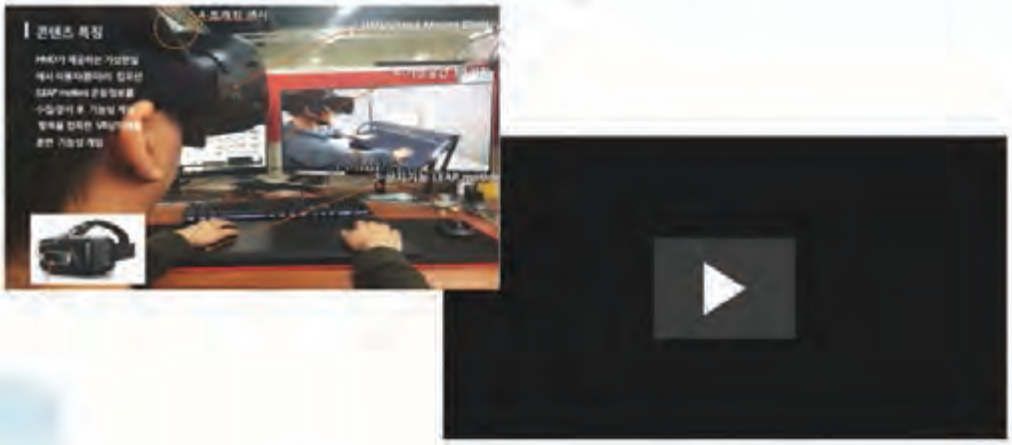
재활의학

재활치료의 대상이 되는 장애는 크게 '의학적 인자에 의한 장애'와
그에 따라 발생하는 '사회적으로 생기는 장애'로 분류되어 각각에 대해서
의학적 재활과 사회적 재활이 필요

VR의 의학적 재활의 응용 영역으로는
-인지/운동능력 평가
-개인별 최적화 훈련
-직업이나 사회생활을 위한 재교육/훈련
-병증에 대한 환자, 가족, 의료진 간의 상호 이해

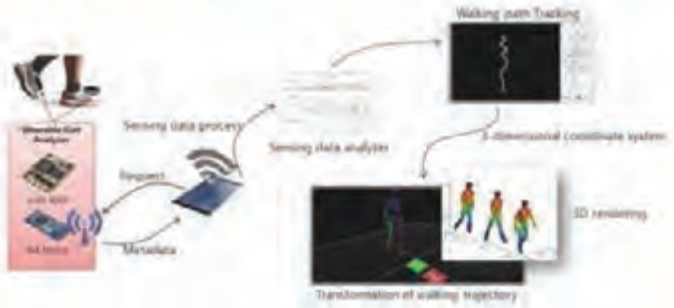
17.

가상현실기반 상지재활훈련 기능성 게임



25.

모듈형 웨어러블 디바이스를 이용한 뇌졸중 환자용 재활운동프로그램



27.

특강 2

가상현실(VR) 기반 전산화 재활시스템

소프트웨어 의료기기 (Software as a Medical Devices, SaMD)

/ 이상우

가상현실(VR) 기반 전산화 재활시스템

소프트웨어 의료기기(Software as a Medical Devices, SaMD)

㈜인더텍
개발 1팀 선임 이상우

intheTech
intheTech Co., Ltd.

VR이란?

VR (Virtual Reality)	현실과는 동 떨어진 완벽한 가상의 공간

Reference: https://steamcommunity.com/games/548010/GameArt?l=koreana

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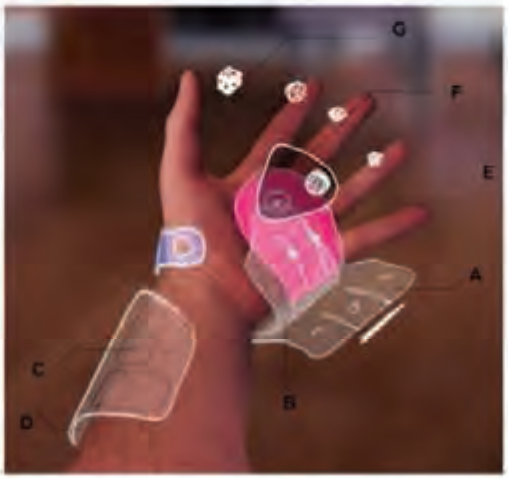
A R (Augmented Reality)	GPS, 중력, Gyroscope 정보에 따른 위치정보 시스템을 기반으로 현실세계와 3차원 가상 이미지를 겹쳐서 하나로 보이게 하는 기술



Reference: https://www.inverse.com/article/42830-virtual-wearables-augmented-reality

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M R (Mixed Reality)	AR + VR의 장점을 혼합하여 현실세계 속 가상 정보를 결합한 기술

Reference: https://www.be-terra.com/platforms/mixed-reality

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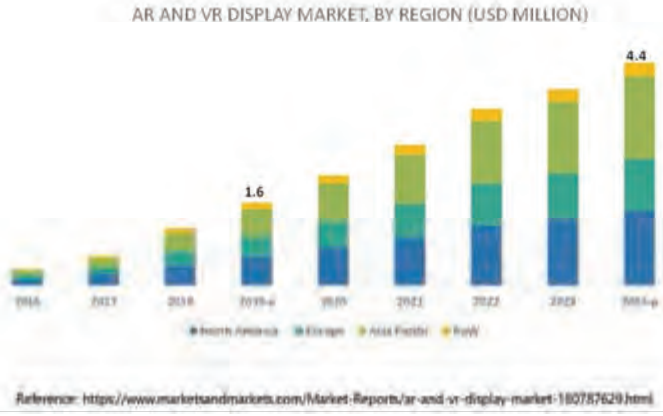
VR 시장 동향

AR 및 VR 시장 규모는 CAGR 21.8%로 2024년 44억 달러로 성장 예상됨

디지털 치료제 시장의 급성장으로 인해 보건의료 영역 동반 성장 기대



Reference: https://www.marketsandmarkets.com/Market-Reports/ar-and-vr-display-market-180787629.html

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최근 연구동향(국내)

VR+시각+청각피드백이 편마비 환자의 균형과 보행 확인 연구에서는 실시한 단기간 훈련은 유의한 차이가 없었으나 30분 이상의 장기간 훈련의 결과는 긍정적일 것으로 예측(전재환, 2019)

안구추적 시스템 사용한 VR 전정재활 훈련 콘텐츠 개발 연구에서는 VR을 활용하면 기존의 재활 보다 몰입할 수 있는 환경을 제공할 수 있고 훨씬 안전함을 강조(이성진, 2020)

편마비를 동반한 뇌졸중 환자에게 VR 기반 코어 안정화 운동을 적용한 결과 대조군에 비해 상지기능(MFT, BBT), 자세조절(BBS)에서 유의한 개선을 보임(김지원 등, 2020)

만성 뇌졸중 환자를 대상으로 상지 근력과 기능 그리고 AROM 증진을 위해 VR 기반(라파엘 스마트 글러브, 비몰입형) 물리치료와 감각 운동을 실시하고 대조군과 비교한 결과 상지 근력, 기능, AROM, Jebsen-Taylor 점수에서 유의미한 향상을 보임(Kim & Lee, 2020)

주요 변수는 Balance, gait, grip strength, functionality, Q.O.L, Falls 등

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최근 연구동향(해외)

해외의 Stroke + VR systematic review 연구에서는 VR이 활성화 되기 이전에 주로 Nintendo, Wii, Play-station, Xbox 같은 게임화면을 VR(비몰입형)로 간주하여 연구가 진행(Felipe et al., 2019)

뇌성마비 아동과 청소년을 대상으로 VR 기반 물리치료를 실시한 결과 balance와 motor skill 향상 근거를 발견. 반면 joint, upper extremity skill, gait, strength, sitting ability에서는 근거가 매우 약했음(Ravi et al., 2017)

VR 기반 물리치료와 일반 물리치료 그리고 중재를 하지 않은 신경계 환자(성인 및 어린이)를 위한 balance 훈련에서 VR 기반 물리치료가 가장 긍정적인 효과를 보임(Juras et al., 2018)

파킨슨병 환자가 균형 연습을 할 때 VR 기술을 사용하면 환자의 운동 능력이 개선됨을 보고(Utah University)

사이언티픽 리포트에 실린 'VR 에서의 이동에 따른 시간 흐름이 일시적인 재보정을 가능케 한다'는 제목의 연구에 따르면 VR 기술이 파킨슨병 환자의 시간 인식 능력을 향상시키는 데 기여한다(메디칼리포트. 2019. 재인용).

무릎수술을 받은 환자의 경우 원격 재활 프로그램이 실제 물리치료사가 지도 하는 것만큼 효과를 보임(Bettger et al., 2020)

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VR 기반 물리치료 장점

①VR 기반 물리치료가 몰입을 유도해 치료가 개인화되고 재활동기를 부여

②다양한 S/W 설계가 가능하여 개인 맞춤형 콘텐츠 개발 가능

③VR 기반 물리치료가 가정에서 실시 될 수 있는 잠재력을 가짐 (단, 충분한 연구 필요)

VR 기반 물리치료 단점

①RCT 문헌 수의 부족과 객관적 지표를 제공할 수 있는 연구 부족

②다양한 S/W의 개발이 가능한 점이 연구 결과 해석에 신중해야 함

③VR 활용을 기본 구성 품이 다수 존재

Reference: https://www.mk.co.kr/news/it/view/2018/02/132252/ 머니투데이 뉴스기사 자료 재인용

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적용 대상

뇌혈관질환(Cerebrovascular disease): stroke, transient ischemic attack(TIA), aneurysm

→ paralysis, weakness of one side, hemiplegia, hemiparesis, loss of balance, confusion 등의 증상

→ 재활 프로그램 운영을 통한 증상 개선

근골격계질환(musculoskeletal disorders, MSDs)- 질환 예방 or 교육 활동에 목표

→ TENS, EST, Traction, 도수치료 등 교육

→ 증상 발생을 방지할 수 있는 예방법 교육

만성퇴행성

→ 초고령사회 진입 대비를 위한 노화로 인한 신체 기능 유지

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디지털 치료 발전 방향

한국전자통신연구원은 VR 사용 시 느끼는 멀미 증상을 줄여줄 수 있는 S/W를 개발(손욱호 박사 연구팀, 2020)

→ 상, 하지 기능 저하 또는 마비 환자를 대상으로 적용 시킴을 물론 고령인구에게도 사용 환경을 제공

신체활동과 콘텐츠 수행을 병행하여 신체 기능과 인지 기능을 동시에 상승 시키는 콘텐츠 개발

30 명의 뇌졸중 환자가 마커리스 모션 센서를 재활 플랫폼으로 구현 한 VR 기술로 재활을 받았고, 대부분의 환자에게 긍정적으로 받아 들여지고 있음을 발견. 물론 이 VR 애플리케이션이 수동 재활을 완전히 대체 할 가능성은 여전히 논쟁의 여지가 있으나 가정 기반 재활 플랫폼으로 개발 유용성을 주장(Iberahim et al., 2020)

VR 내 아바타를 활용한 동작 모방 수행(Duke university, Virtual Exercise Rehabilitation Assistant: VERA)

→ 환자 한 명당 평균 2,745$ 가 절감되는 것으로 주장(Bettger et al., 2020)

VR 기반 물리치료 임상실습 프로그램 개발(삼육대학교)

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제한점

일반화 하기에 연구의 수와 대상자 규모가 부족

지구력, 근력, 균형, 운동기능 등 개인의 신체특성을 고려한 연구 미흡

실제 대면 치료와 달리 개인이 처한 여러 환경에서 나타날 수 있는 위험요인 제어가 어려움

눈으로 보는 것과 뇌로 판단하는 것의 차이가 누적돼 시각적 피로감을 유발

의료기관 내 VR 재활서비스 도입을 위해서는 의료기기 인증을 겸한 임상시험, 재활 콘텐츠 다양화, 가격 등이 넘어야 할 문제(중앙대학교 산학협력단. '의료ICT융합컨소시엄 협력과제 개발 수요조사' 2017).

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가상현실(VR) 기반
전산화 재활시스템 콘텐츠 소개
(개발 초기 단계)

Contents		목표
	과녁 맞추기	집중을 유지하고 조작하는 지속적 집중력과 시각 고정 능력을 활용하여 수행 상지의 잔존능력으로 수행
	길 따라가기	해결해야 할 과제에 대해 집중, 결정, 판단, 계획 등 여러 가지 능력을 복합적으로 활용하여 수행
	길 찾기	외부로부터 들어오는 다양한 정보들을 일시적으로 보유하는 작업기억 능력을 활용하여 수행
	낚시	집중을 유지하고 조작하는 지속적 집중력과 귀를 통해 받아들인 감각자극을 판별, 해석, 조직화하는 청지각을 활용하여 수행 상지의 잔존능력으로 수행

Contents		목표
	농구	집중을 유지하고 조작하는 지속적 집중력과 개인이 가진 손의 근력을 통해 목표 압력을 맞추도록 하여 Fine motor function을 강화시키도록 수행 상지의 잔존능력으로 수행
	다트	집중을 유지하고 조작하는 지속적 집중력과 촉각을 활용하여 수행
	드럼	집중을 유지하고 조작하는 지속적 집중력을 활용하여 수행 상지의 잔존능력으로 수행
	몇 층 일까요?	정보들을 일시적으로 보유하는 작업기억과 귀를 통해 받아들인 감각자극을 판별, 해석, 조직화하는 청지각을 활용하여 수행

Contents	목표
 원하고요?	필요한 자극에만 집중하는 선택적 집중력과 귀를 통해 받아들인 감각자극을 판별, 해석, 조직화하는 청지각을 활용하여 수행
 보물찾기	집중을 유지하고 조작하는 지속적 집중력과 과제를 계획하고 실행으로 옮기는 실행력을 활용하여 수행
 볼링	집중을 유지하고 조작하는 지속적 집중력과 개인이 가진 손의 근력을 통해 목표 압력을 맞추도록 하여 Fine motor function을 강화 시키도록 수행 상지의 잔존능력으로 수행
 복지기	정보들을 일시적으로 보유하는 작업기억과 촉각을 활용하여 수행 상지의 잔존능력으로 수행

Contents	목표
 소리 탁 찾기	집중하고 있는 자극에서 다른 자극으로 이동하는 변화적 집중력과 대상을 서로 비교하는 실행력을 활용하여 수행
 어느 통에서	집중을 유지하고 조작하는 지속적 집중력과 귀를 통해 받아들인 감각자극을 판별, 해석, 조직화하는 청지각을 활용하여 수행
 원지우기	집중을 유지하고 조작하는 지속적 집중력을 활용하여 수행 상지의 잔존능력으로 수행
 지구 지키기	필요한 자극에만 집중하는 선택적 집중력을 활용하여 수행

Contents		목표
	청기백기	집중을 유지하고 조작하는 지속적 집중력과 과제를 계획하고 실행으로 옮기는 실행력을 활용하여 수행 상지의 잔존능력으로 수행
	재영계	정보들을 일시적으로 보유하는 작업기억을 활용하여 수행
	터트리기	정보들을 일시적으로 보유하는 작업기억과 순간적인 눈의 움직임을 활용하여 수행 상지의 잔존능력으로 수행
	하늘고양이	정보들을 일시적으로 보유하는 작업기억과 계산능력을 활용하여 수행

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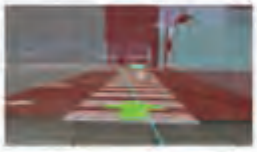
Contents		목표
	횡단보도	집중을 유지하고 조작하는 지속적 집중력과 과제를 계획하고 실행으로 옮기는 실행력을 활용하여 수행

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EYAS VR

EYE-EAR-ATTENTION SYSTEM

경청해 주셔서 감사합니다.

Thank you for listening.

특강 3

물리치료사의 새로운 영역

/ 박철호

사회적 기업

[Social Enterprise]

영리기업이 이윤 추구를 목적으로 하는데 반해, **사회적기업은 사회서비스의 제공 및 취약계층의 일자리 창출을 목적**으로 하는 점에서 영리기업과 큰 차이가 있다.

출처 : 사회적기업 [Social Enterprise, 社會的企業] (두산백과)

파타고니아의 사명(Mission Statement)

We're in Business to save our home planet

"우리는 우리의 터전, 지구를 되살리기 위해 사업을 합니다"

사회적 경제조직

- 사회적 기업(2891개), 협동조합 1만3000개
- 마을기업, 자활기업을 포함해 37만여 명이 종사

2016, 소셜벤처대회

Team : Be ambitious

2020, 소셜벤처대회

Team : ???

- Health Professional
- Physio/Physical Therapist
- Social value / Problems
- Social Entrepreneur
- Your Mission
- ?
- ??
- ???

BOTRIUM

바른 몸 건강한 삶을 생각하는 기업 바트리움(주)

2017 사회적기업 1단계

한국 사회적기업 진흥원 - 육성사업 선정

BOTRIUM's 미션

1. 병원 치료를 받기 힘든 사람들을 도울 수 있는 방법은 없을까?!
2. 병원치료 후 재발 방지 할 수 있는 방법은 없을까?!
3. 이직률 높은 물리치료사들의 양질의 일자리 제공할 수는 없을까?!

지원 내역
사업비(약 2천만원)

* 매년 정책, 사업 형태, 실적에 따라 차이가 있을수 있음

2018~2019 사회적기업 2 단계

대구시/고용 노동부 - 예비사회적기업 지정

주요 Activities

1. "바트리움 운동케어" 런칭
2. 장애인 평생 운동케어 실시
3. 청소년/직장인 바른몸 사용법 특강 실시
4. 지역주민 대상 병원 치료후 전문운동 케어 실시
5. "바트리움 필라테스" 런칭
6. 사회적기업 대상 기업 탐방 체험

BOTRIUM

Pilates
BOTRIUM

지원 내용(2년간)
사업 개발비(약 ~5천만원)
인건비(약 2천만원)

* 매년 정책, 사업 형태, 실적에 따라 차이가 있을수 있음

2020 ~ 사회적기업 3단계

고용 노동부 - 사회적기업 인증

- 주요 Activities

1. 사회적기업 인증
2. 물리치료사 대상 일자리 창출
3. (비대면) 청소년 대상 바른몸 사용법 영상물 제작
4. 2020년 바트리움 세미나 개최
5. 콜라보 프로젝트 - 이음발달지원센터(사회적기업 진흥원)

사회적기업 인증서

인증번호 : 제2020-026호 (최초인증일 2020-03-11)

사회적 목적 실현 유형 : 혼합형

「사회적기업 육성법」 제7조 및 「사회적기업 육성법 시행규칙」 제10조에 따라 위 기관을 사회적기업으로 인증합니다.

2020년 3월 11일

고용노동부장관

서울신문

대구 사회적경제기업 '상생에듀(SSEDU)' 론칭… 비대면 진로·직업 교육 콘텐츠 제공

20 육성사업 후속지원 사업

[콜라보 프로젝트] 취약계층 아동을 대상으로 하는 복합적 프로그램을 기획하는 '풀케어 팀' <이음발달지원센터&바트리움(주)>

지원 내용(3년간)
사업 개발비(약 ~5천 ~ 1억)
인건비(약 4천 3백)

* 매년 정책, 사업 형태, 실적에 따라 차이가 있을수 있음


BOTRIUM
보트리움(주)
core values
고용노동부
Colorful
DAEGU
한국사회적기업진흥원
Social Enterprise
사회적기업

특강 4

다양한 아이템을 활용한 기술창업

/ 이수경

특허 출원 및 등록 실적

번호	특허/프로그램명	국가명	출원 등록일	출원 · 등록번호 / 출원 · 등록자수	비고
1	욕창방지 및 자세교정 방석	한국	2016.09.21	10-1922773/8	등록
2	침상환자의 고관절 외회전 교정기	한국	2016.09.21	10-1841358/8	등록
4	다이나믹 밸런서	한국	2016.10.17	10-1668428/4	등록
5	파킨슨병 환자용 보행보조장치	한국	2016.10.31	10-1800557/8	등록
6	쇼핑용 카트	한국	2016.12.07	10-1808965/5	등록
7	마비측 환자의 교정용 신발	한국	2016.12.22	10-2016-0176934/5	출원
8	발가락 사이 넓힘 보조기	한국	2016.03.03	10-2017-0027477/5	출원
9	센들 기반의 자세교정 장치	한국	2017.03.03	10-1923676/5	등록
10	발가락 사이 넓힘 보조기	한국	2017.03.03	10-1933514/5	등록
11	절첩식 여닫이문의 자동개폐장치	한국	2017.03.14	10-2017-0031747/5	출원
12	발가락 너비를 교정하고 착용하는 보조신발	한국	2017.03.14	10-2017-0031615/5	출원
13	상체 운동기능을 겸비한 교정용 상의	한국	2017.05.18	10-1861041/5	등록
14	상체 운동기능을 겸비한 다기능 교정용 상의	한국	2017.05.18	10-1861040/5	등록
15	휠체어의 손잡이 구조	한국	2017.06.02	10-1884768/5	등록
16	밸런스 테이핑용 탄력테이프	한국	2017.08.24	10-1939731/2	등록
17	다기능 스마트 깔창	한국	2017.09.01	10-1884754/10	등록
18	다양한 스트레칭 운동이 가능한 기능성 의자	한국	2017.09.15	10-2017-0778701/7	출원
19	거동 불편자용 양변기 착석 및 기립보조장치	한국	2017.09.15	10-2017-0118745/7	출원
20	자가 스트레칭용 탄력수건	한국	2017.09.15	10-1933518/7	등록
21	배변이 용이한 양변기 보조장치	한국	2017.10.27	10-1931262/7	등록
22	다기능 복부 드로잉-인벨트	한국	2017.11.01	10-2017-0144427/2	출원
23	다이나믹 밸런서	한국	2017.11.01	10-1887097/2	등록
24	쾌변 유도 변기발판	한국	2017.11.14	10-1931238/2	등록
25	발바닥 근육 강화 운동기	한국	2017.12.04	10-2017-0164893/2	출원
26	다각도 조절 손잡이	한국	2017.02.08	10-2018-0015560/2	출원
27	엎드린 자세 운동 장치	한국	2017.02.27	10-2018-0023622/2	출원
28	스쿼트 운동 장치	한국	2018.03.19	10-2018-0031417/2	출원
29	착용형 마사지 장치	한국	2018.06.12	10-2018-0067347/2	출원
30	접이식 테이블을 구비한 휠체어	한국	2018.07.16	10-2018-0082123/8	출원
31	하지 손상 방지 기능을 갖는 양말	한국	2018.08.17	10-2018-0096079/8	출원
32	기능성 양말	한국	2018.08.17	10-2018-0096073/7	출원
33	다이나믹 밸런서 제어시스템 및 제어방법	한국	2018.12.05	10-2018-0154974/1	출원
34	다이나믹 밸런서를 이용한 운동능력 측정	한국	2018.12.05	10-2018-0154976/1	출원
35	신체 균형능력 측정 및 운동처방을 제공하는 다이나믹 밸런서	한국	2018.12.05	10-2018-0154977/1	출원

• 주관기관(법인) 정보

법인명(한글)		주식회사 오투랩	법인번호	180111-1167922
업종		제조, 건강지표측정장비 제작 운동 및 건강생활 교육 및 유통 연구개발업, 맞춤형 운동 서비스		
주 생산품		다이나믹 밸런스 엑스건마사지	정규 종업원 수	4명
본사주소		부산광역시 부산진구 엄광로 176, 301호 (가야동, 동의대, 산학협력관)		
대표 이사	성명 (생년월일)	이수경 (1976. 04. 05)		
	과학기술인 등록번호	11034678		

• 특허출원. 등록실적

순번		출원인	등록/출원번호	등록/출원일	발명의 명칭
등 록	1	㈜오투랩	10-1887097	2018.08.03.	다이나믹 밸런서
	2	㈜오투랩	10-1923676	2018.11.23.	샌들기반 자세교정장치
	3	㈜오투랩	10-1931238	2018.12.14.	쾌변유도 변기발판
출 원	1	㈜오투랩	10-2018-0113921	2018.09.21.	다이나믹 밸런서 제어시스템 및 제어방법
	2	㈜오투랩	10-2018-0154976	2018.12.05.	다이나믹 밸런서를 이용한 운동능력 측정 제어시스템
	3	㈜오투랩	10-2018-0154977	2018.12.05.	신체 균형능력 측정 및 운동처방을 제공하는 다이나믹 밸런스
	4	㈜오투랩	10-2018-0154974	2018.12.05.	다이나믹 밸런서 제어시스템 및 제어방법
	5	㈜오투랩	10-2019-0061393	2019.05.24.	압력 분포를 활용한 다이나믹 밸런서


Only One Lab
2018.03
지역우수연구자
기업연계
R&D 사업
2018.06
창업선도대학
(경성대) 선정
2018.08
㈜오투랩
법인설립 및
사업자등록
2018.11
연구소기업 등록
2019.01
벤처기업 등록
2019.04
Start-up
NEST기업 선정


· 연구소기업, 벤처기업, ISO인증, 신보 NEST 5기 기업, 협약서
연구소기업 등록증
벤처기업확인서
Start-up NEST기업 선정서
㈜오투랩
인 증 서

• 2019-2020년 지역 및 정부 과제 신청 및 선정내역

	사업명	아이템	담당자	선정유무(이유)
1	연구개발특구 기술이전	다이나믹 밸런스	정주희	미선정(실적 X)
2	IP 역량강화 경쟁대	다이나믹 밸런스	정주희	선정
3	URP 사업	밸런스헤어링	정주희	미선정
4	Start up NEST (사업계획서 / 초기 IR 발표자료)	다이나믹 밸런스	이우경 박진성 정주희	선정
5	지식서비스아이디어사업화	스마트 폼 밸런스	정주희	미선정
6	브라이트클럽	다이나믹 밸런스	정주희	미선정
7	크라우드 펀딩	한손으로 쓰는 근육자극봉	정주희 (홍통희 참가인원 박진성 손효정 정주희)	선정(이후 직접 출품하여 중단)
8	디지털 헬스케어	스마트 폼 밸런스	정주희	미선정
9	챔피언스 스포츠 스타트업	다이나믹 밸런스	정주희	미선정
10	디딤돌 3차 공고 사업 지원	스마트 폼 밸런스	정주희	미선정
11	차세대 오픈패치 사업	스마트 폼 밸런스	정주희	미선정
12	연구특구 성장지원	다이나믹 밸런스	정주희	선정
13	K-Start up 사업	다이나믹 밸런스	정주희	미선정
14	지능형서비스산업 신뢰성 확보를 위한 인증지원	GS 인증	정주희 손효정	선정
15	부산 지역연구개발 우수성과 신청		정주희 손효정	선정
16	부산 d-day	다이나믹 밸런스	정주희	미선정
17	소비자 만들 조사 전문가	다이나믹 밸런스 소비자 시장조사	정주희	선정

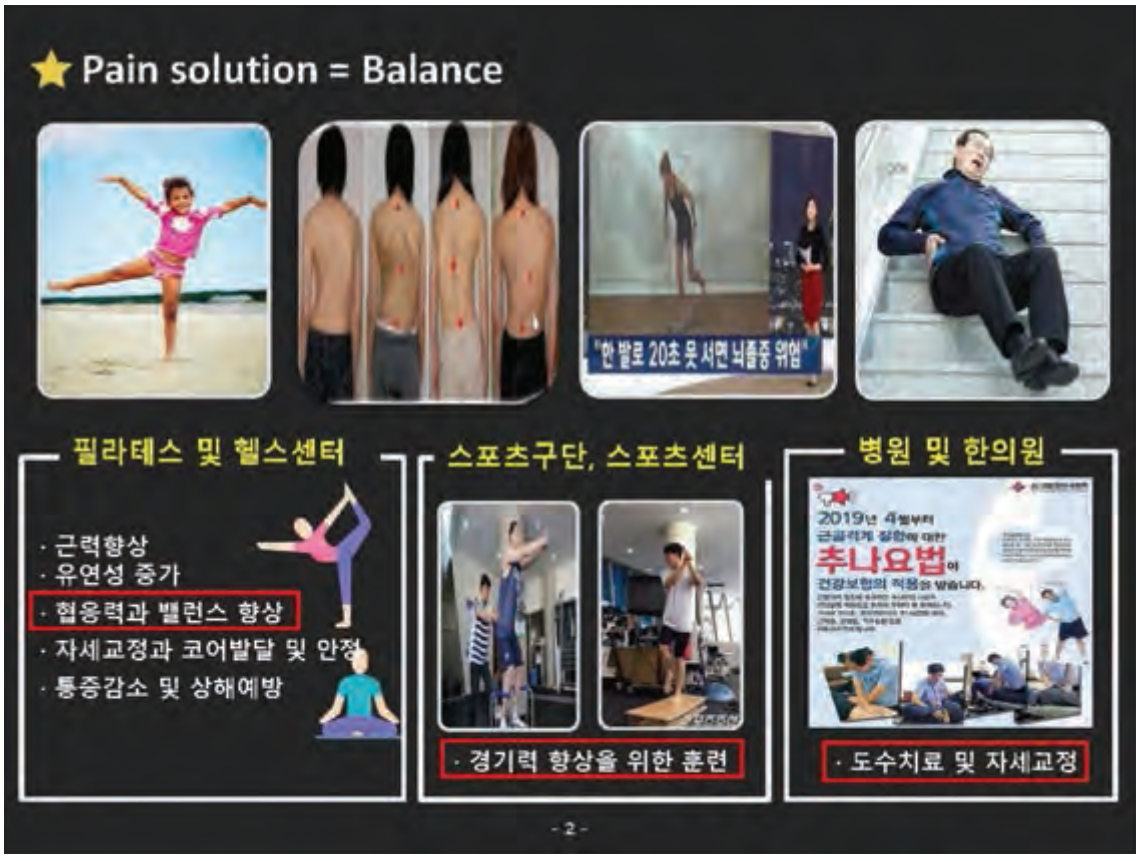
	사업명	아이템	담당자	선정유무(이유)
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
20	[illegible]	[illegible]	[illegible]	선정
21	[illegible]	[illegible]	[illegible]	선정
22	[illegible]	[illegible]	[illegible]	미선정
23	[illegible]	[illegible]	[illegible]	미선정
24	[illegible]	[illegible]	[illegible]	
25	[illegible]	[illegible]	[illegible]	
26	[illegible]	[illegible]	[illegible]	
27	[illegible]	-	[illegible]	
28	[illegible]	-	[illegible]	

★ Life style

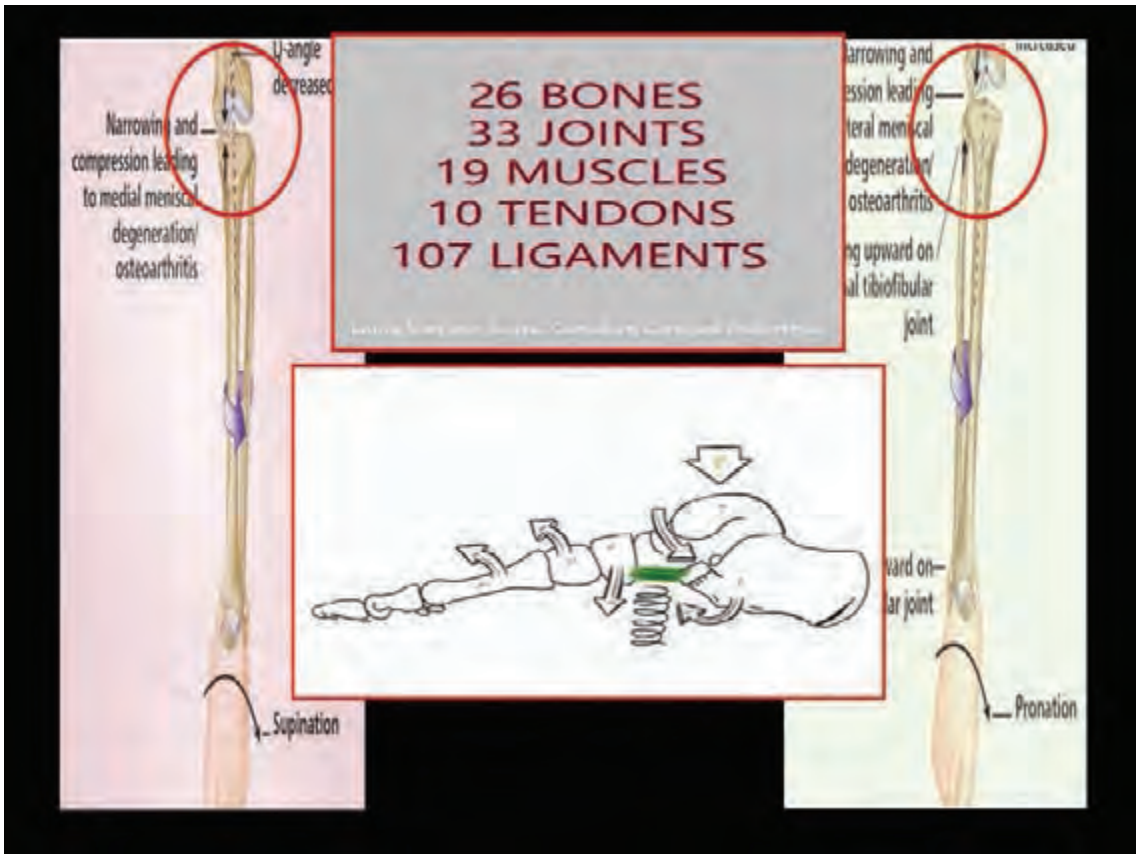
일상생활 자세와 습관

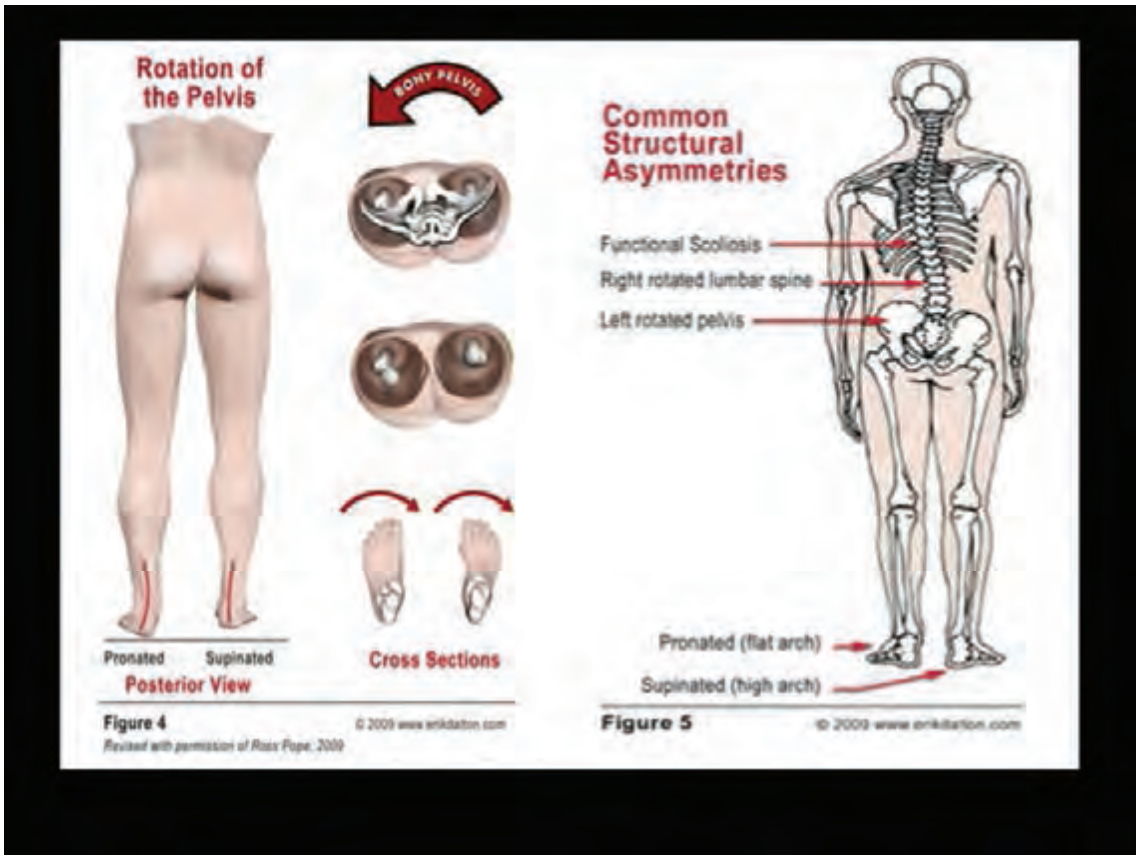
- 팔짱, 짝다리, 계단 오를때와 내릴때
- 지갑과 가방, 휴대폰, 잠잘 때와 휴식할 때


Pain
나쁜자세와 불균형
· 나쁜 자세와 불균형 → 측만증, 목-허리 디스크
· 편향된 자세와 운동 → 기능장애, 목-허리통증
연령별 척추측만증 환자 비율


Pain solution = Balance
"한 발로 20초 못 서면 뇌졸중 위험"
필라테스 및 헬스센터
· 근력향상
· 유연성 증가
· 협응력과 밸런스 향상
· 자세교정과 코어발달 및 안정
· 통증감소 및 상해예방
스포츠구단, 스포츠센터
· 경기력 향상을 위한 훈련
병원 및 한의원
추나요법
· 도수치료 및 자세교정
- 2 -

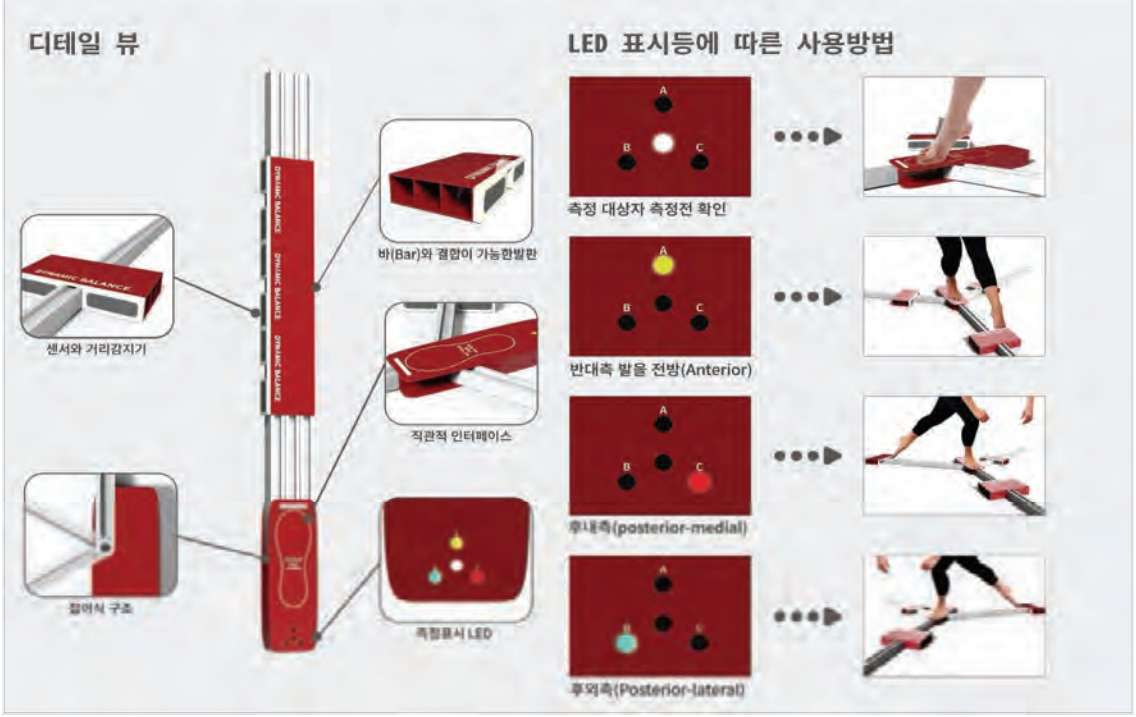

Problem – 주관적 측정
실손의료보험금 지급 많은 질병
(2018년 비급여 진료비용 현황)
추나 및 자세 교정 전, 후
교정전
1차시술후
2차시술후
청림한의원
필라테스 40회 후 자세교정 · 체형 변화
1회당 교정 비용 : 5만원 - 50만원


U-angle decreased
Narrowing and compression leading to medial meniscal degeneration/ osteoarthritis
26 BONES
33 JOINTS
19 MUSCLES
10 TENDONS
107 LIGAMENTS
Supination
Pronation


Rotation of the Pelvis
BONY PELVIS
Pronated
Supinated
Posterior View
Cross Sections
Figure 4
Revised with permission of Ross Pope, 2009
Common Structural Asymmetries
Functional Scoliosis
Right rotated lumbar spine
Left rotated pelvis
Pronated (flat arch)
Supinated (high arch)
Figure 5

★ 다이나믹 밸런스(신체균형측정장비) 소개

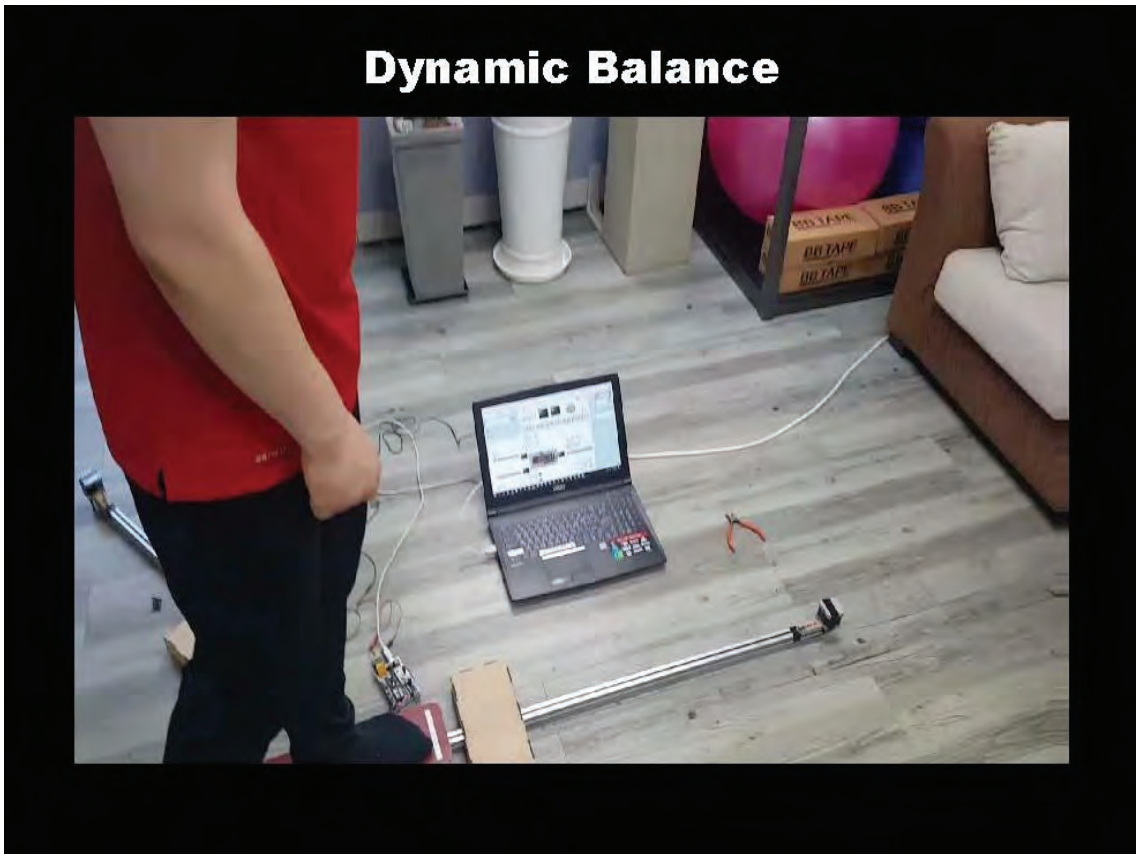
★ 다이나믹발란스(신체균형측정장비) 소개

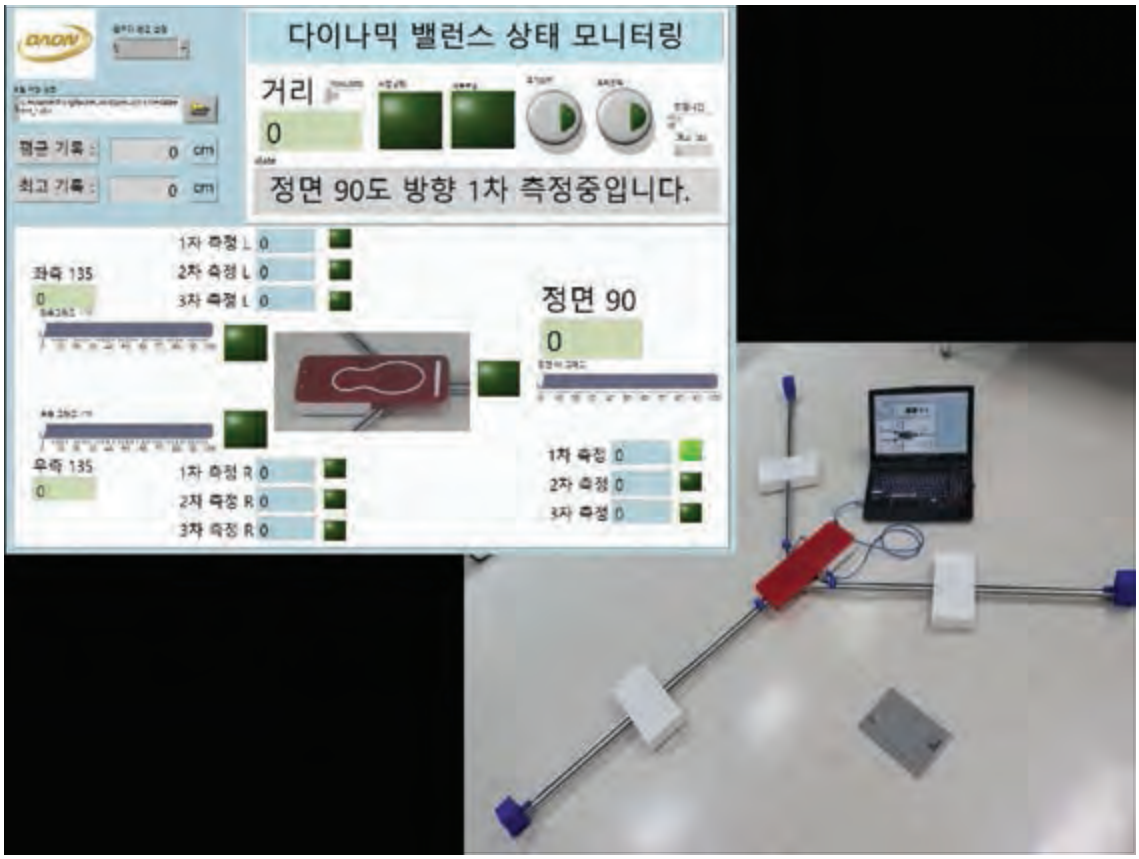



중앙, 앞, 좌,우 압력 센서
부착
앞,좌,우 발판에
전자 거리측정계
기판 부착
각 색칠부위에 압력 센서
와 압력정도를 알려주는
램프 설치


Computer Graphic 기초 모델링 완성도


Computer Graphic 기초 렌더링 작업
DYNMIC BALANCE


Dynamic Balance

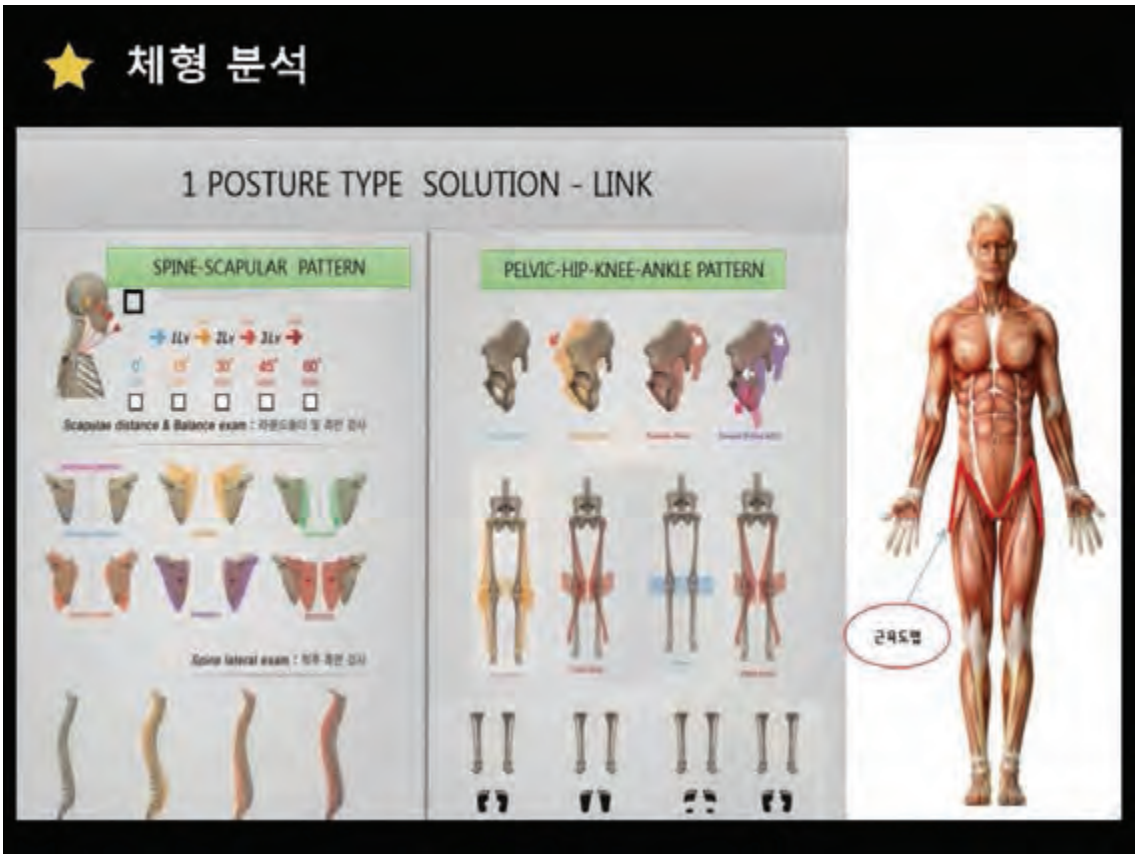

다이나믹 밸런스 상태 모니터링
거리
0
정면 90도 방향 1차 측정중입니다.
평균 기록 :
최고 기록 :
좌측 135
우측 135
정면 90
1차 측정 L
2차 측정 L
3차 측정 L
1차 측정 R
2차 측정 R
3차 측정 R

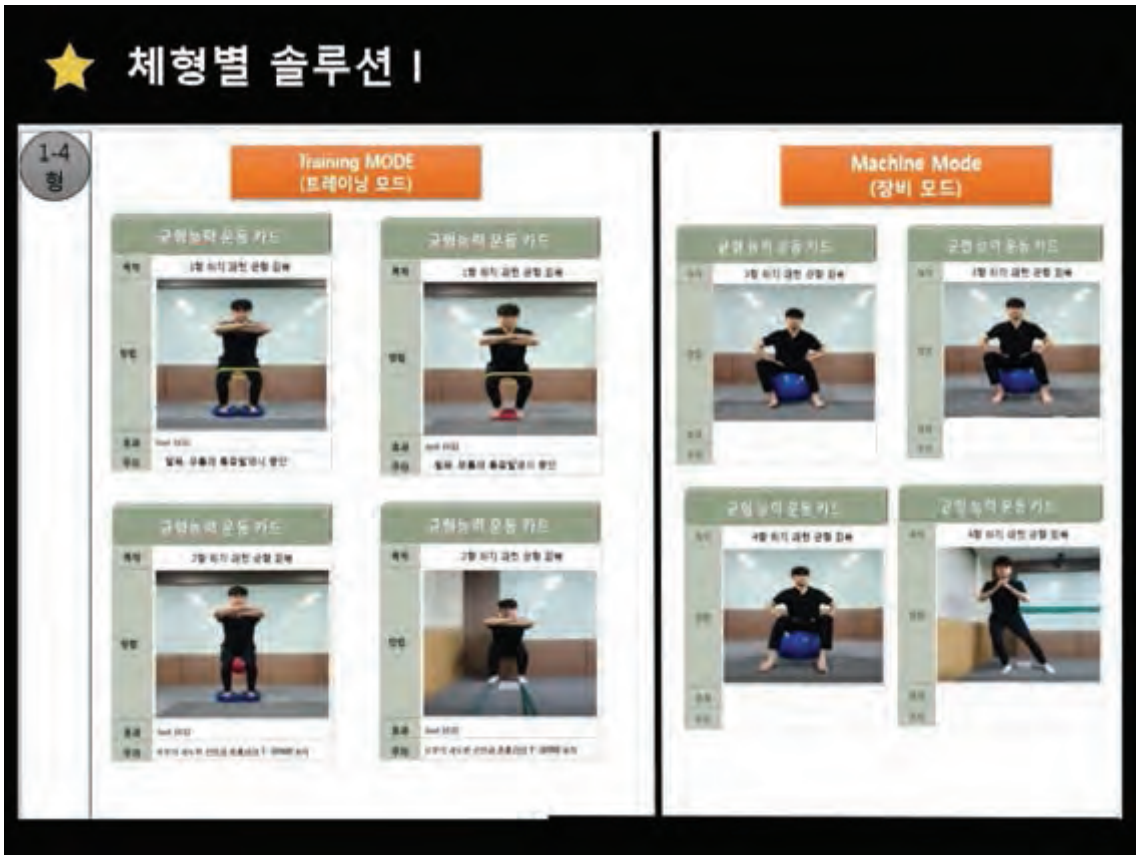

Service
ARCH TYPE
FOOT ALIGNMENT
체형 분류
연습 모드
테스트 모드
워크아웃 모드
DYNAMIC BALANCE
· PC연동 호환 기능
: 태블릿PC, 스마트폰 앱, 웨어러블 디바이스
· 연습모드
: 동적 균형 능력에 대한 장비 체험으로 측정 방법 인식
· 측정모드
: 양발모드-체중, 체질량지수/한발모드-세방향으로 각 3회 측정

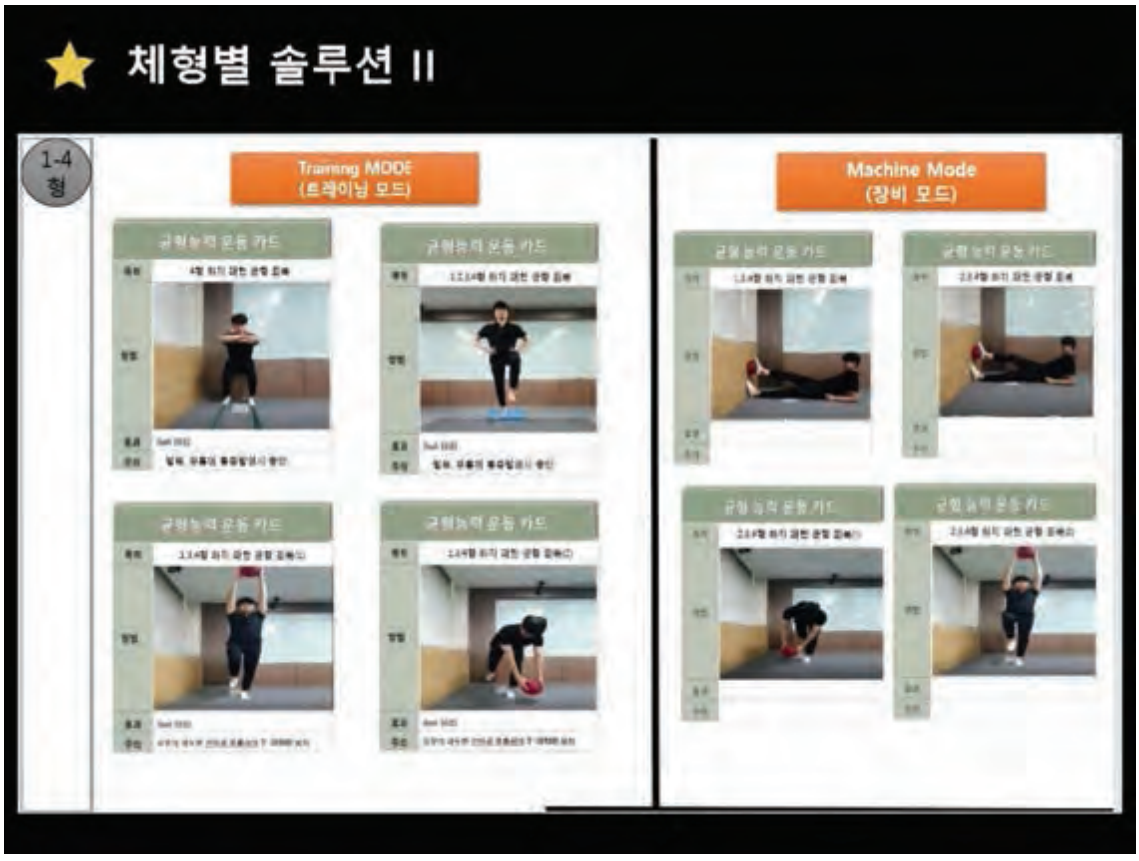
★ 체형 분석 연구


1 POSTURE TYPE
전면
1체형
P
P
PRONE TO BOTH PRONATION..
Stance parameters
Stance parameters

★ 체형 분석


1 POSTURE TYPE SOLUTION - LINK
SPINE-SCAPULAR PATTERN
PELVIC-HIP-KNEE-ANKLE PATTERN
Scapular distance & Balance exam :
근육도법


체형별 솔루션 I
1-4형
Training MODE
(트레이닝 모드)
Machine Mode
(장비 모드)


체형별 솔루션 II
1-4형
Training MODE
(트레이닝 모드)
Machine Mode
(장비 모드)


Competition
Huber 360
Dynamic Balance
3D Newton
균형측정
체형별 솔루션
정보
공간, 가격
정보
공간, 가격
인력
CUSTOMER
체질량 지수 측정
건강증진 및
일반화된 프로그램
FITT
솔루션
모든 대상자
IN BODY (체성분 검사)


Customer Indicators
김진선님의 Dynamic balance 동적균형능력 점수
Rt.
112.31
DBT 동적균형능력 종합점수
Lt.
114.44
My DBT
인스타
바디퍼스트 플랫폼
연은 매체(KNN2019지역대학을 가다 2018년 9월 7일 방영)
- 15 -


Team
대표 이 수 경
기획실장 박 진 성
협력이사 이 승 용
기획팀 양 주 희
Network Team
제이케이 지승균
- 제품 개발
알방컴퍼니 박성훈
- 소프트웨어 개발
바디피스트 강두엽
(교육서비스업)
- 물리치료학 석사
바른몸운동처방센터
김진웅
- 물리치료학 석사
필라테스 협회 부총경 지부장
& 모던 필라테스 대표
바이탈 필라테스
김수호 대표
UFC 최두호 선수


균형능력 심포지엄 2018
노인의 균형능력, 과거와 현재 그리고 미래
Only One Family

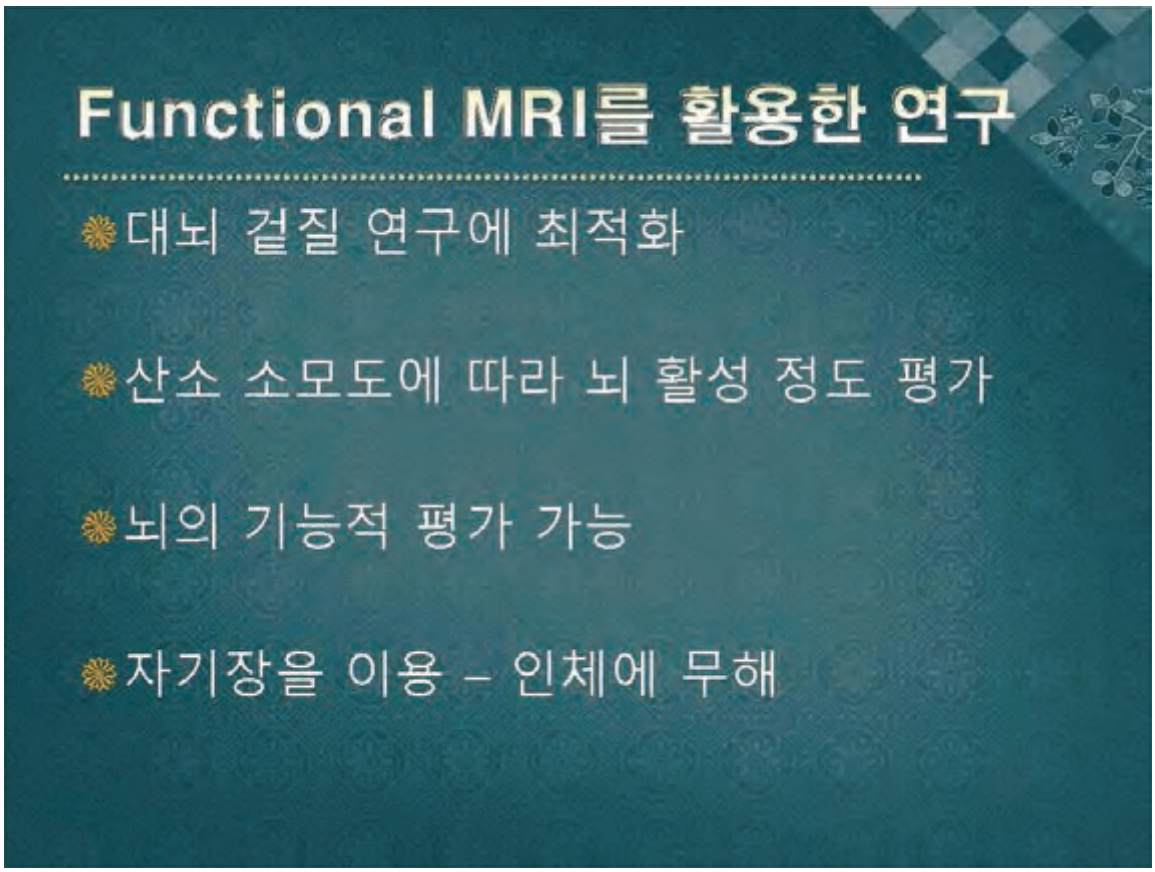

Only One Family

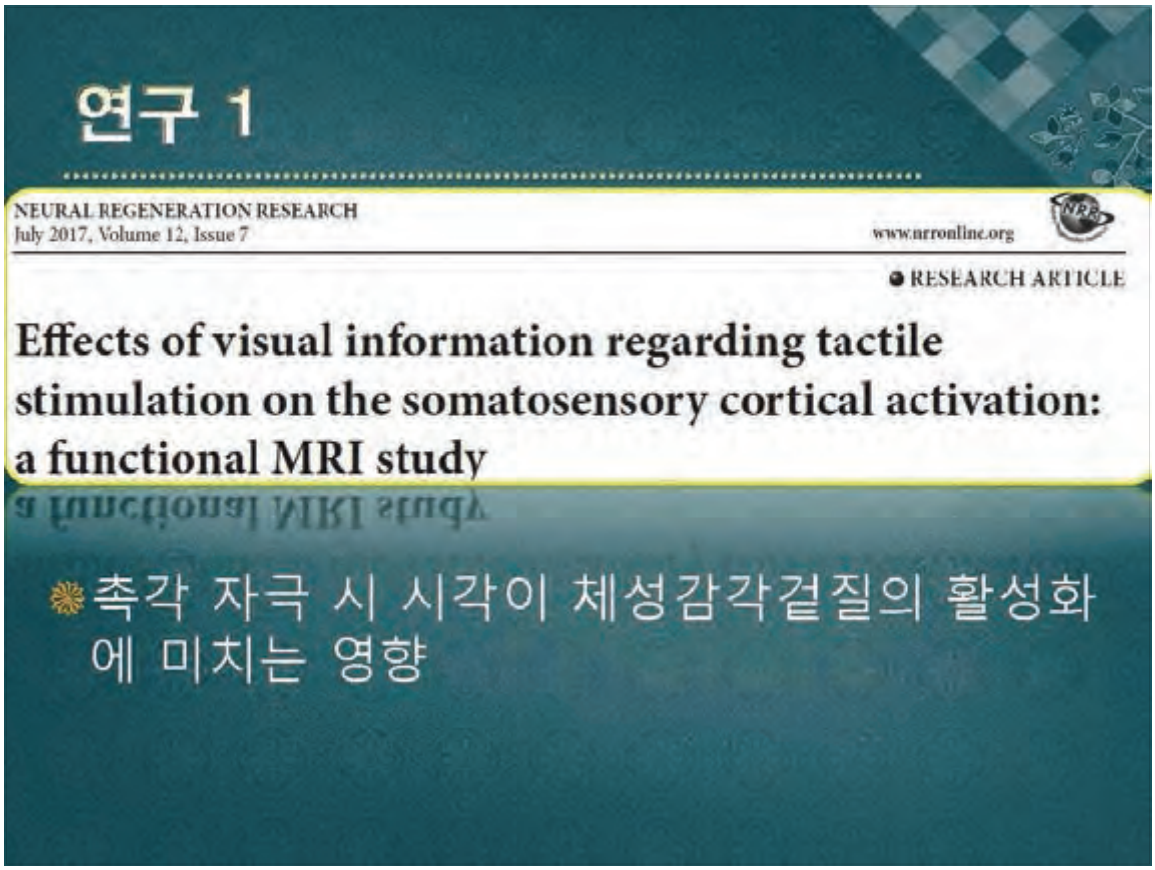
논문발표 1

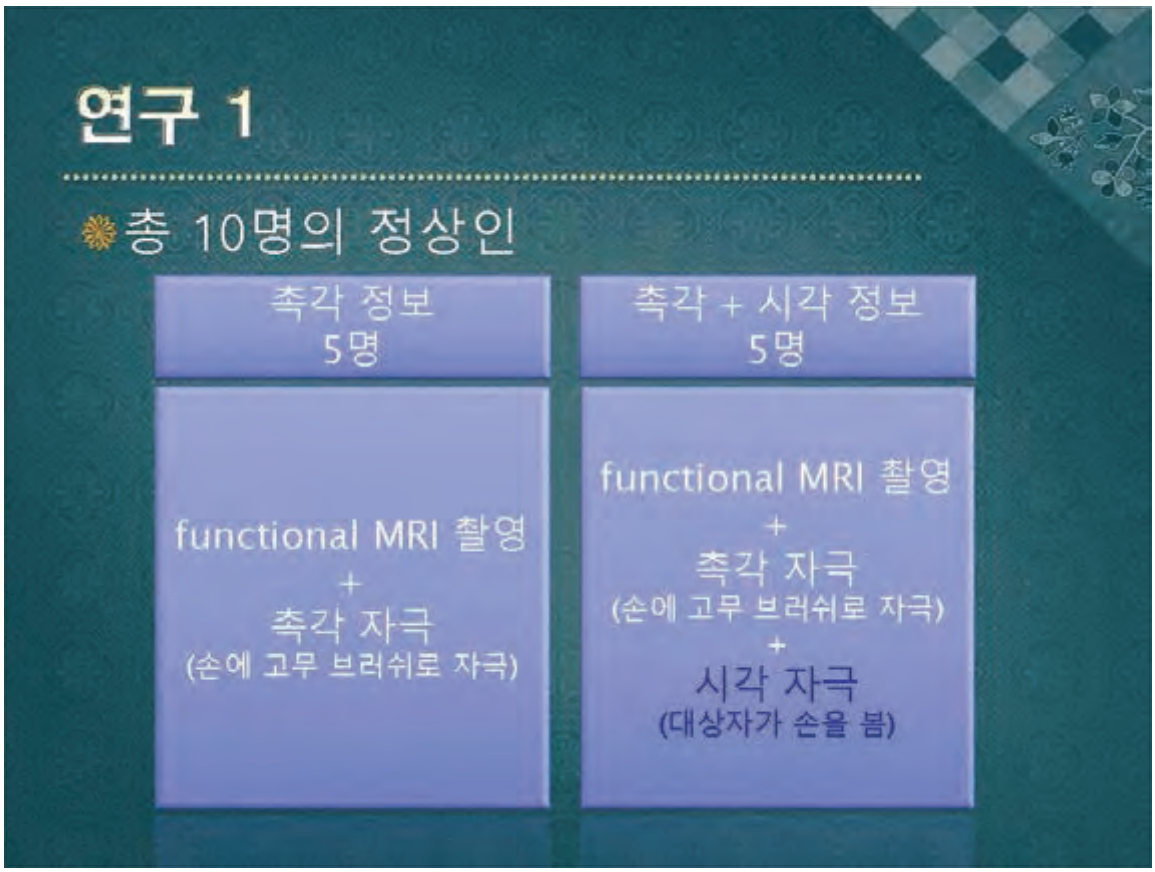
Study for brain activations using functional MRI

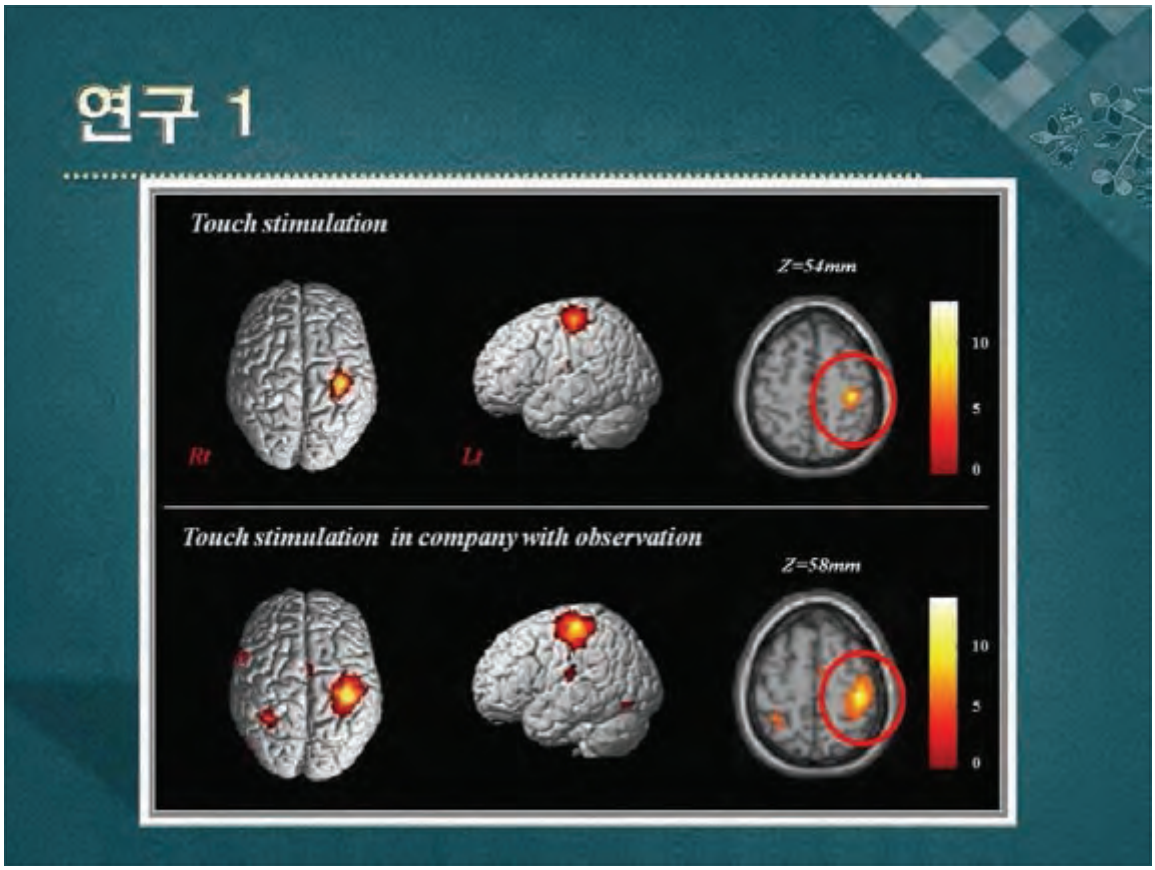
/ 권혁규

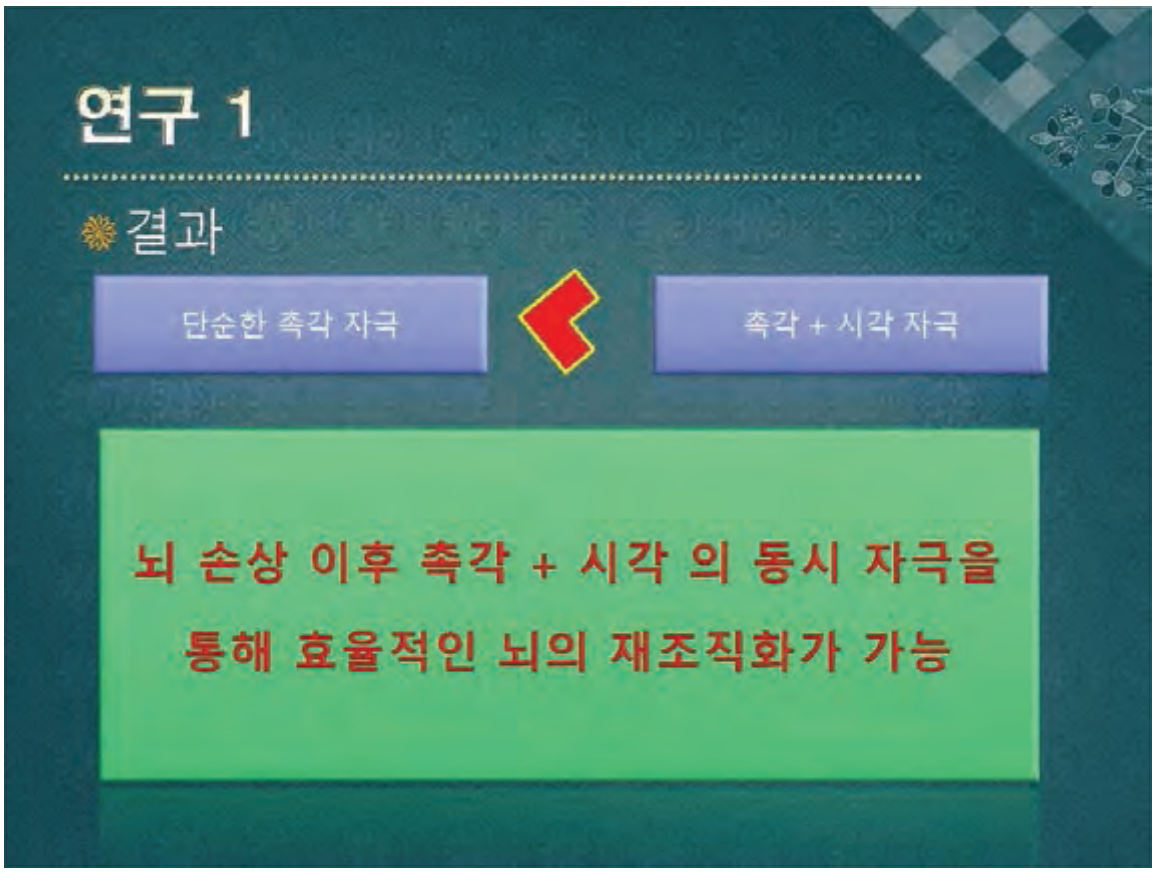

Study for brain activations using functional MRI
을지대학교 권혁규


Functional MRI를 활용한 연구
대뇌 겉질 연구에 최적화
산소 소모도에 따라 뇌 활성 정도 평가
뇌의 기능적 평가 가능
자기장을 이용 – 인체에 무해


연구 1
NEURAL REGENERATION RESEARCH
July 2017, Volume 12, Issue 7
www.nrronline.org
RESEARCH ARTICLE
Effects of visual information regarding tactile stimulation on the somatosensory cortical activation: a functional MRI study
촉각 자극 시 시각이 체성감각겉질의 활성화에 미치는 영향


연구 1
총 10명의 정상인
촉각 정보
5명
촉각 + 시각 정보
5명
functional MRI 촬영
+
촉각 자극
(손에 고무 브러쉬로 자극)
functional MRI 촬영
+
촉각 자극
(손에 고무 브러쉬로 자극)
+
시각 자극
(대상자가 손을 봄)


연구 1
Touch stimulation
Z=54mm
Rt
Lt
10
5
0
Touch stimulation in company with observation
Z=58mm
10
5
0


연구 1
결과
단순한 촉각 자극
촉각 + 시각 자극
뇌 손상 이후 촉각 + 시각 의 동시 자극을
통해 효율적인 뇌의 재조직화가 가능

연구 2

NEURAL REGENERATION RESEARCH www.nrronline.org

RESEARCH ARTICLE

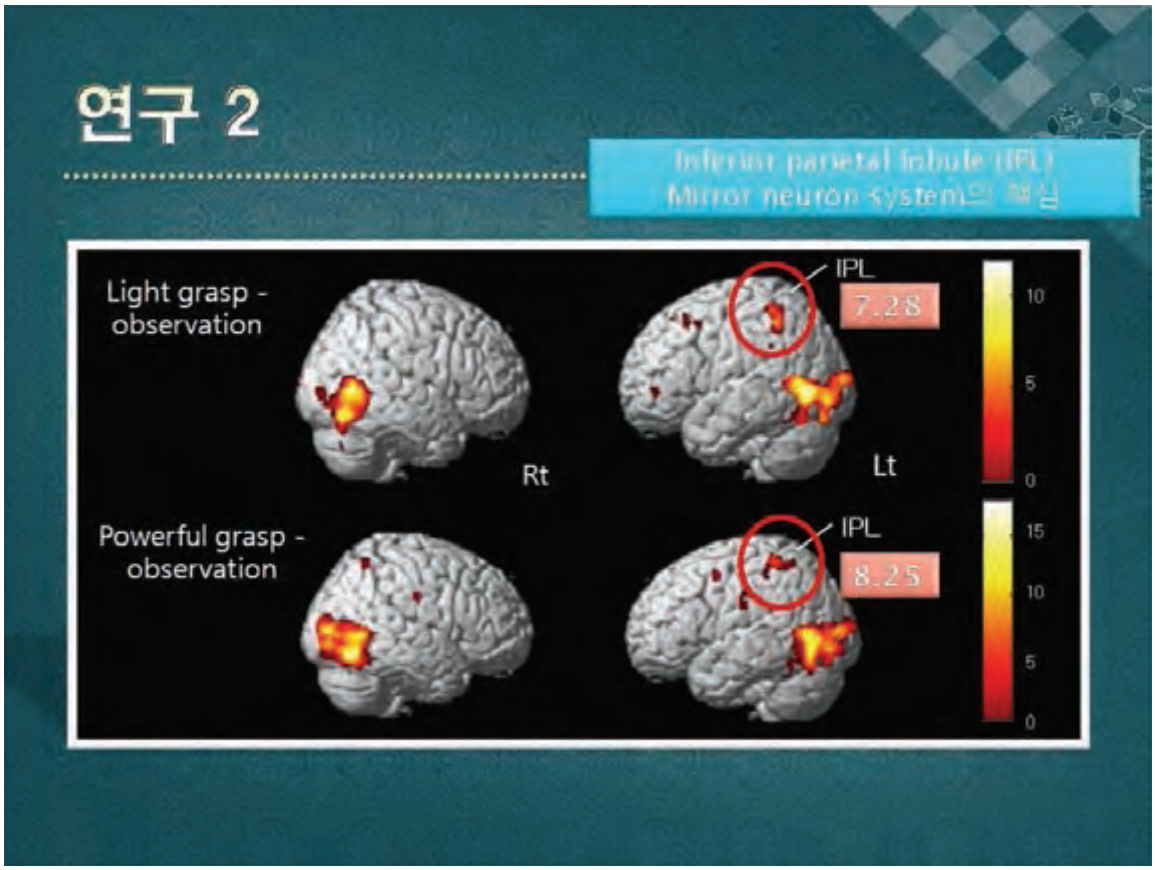
Brain activation induced by different strengths of hand grasp: a functional magnetic resonance imaging study

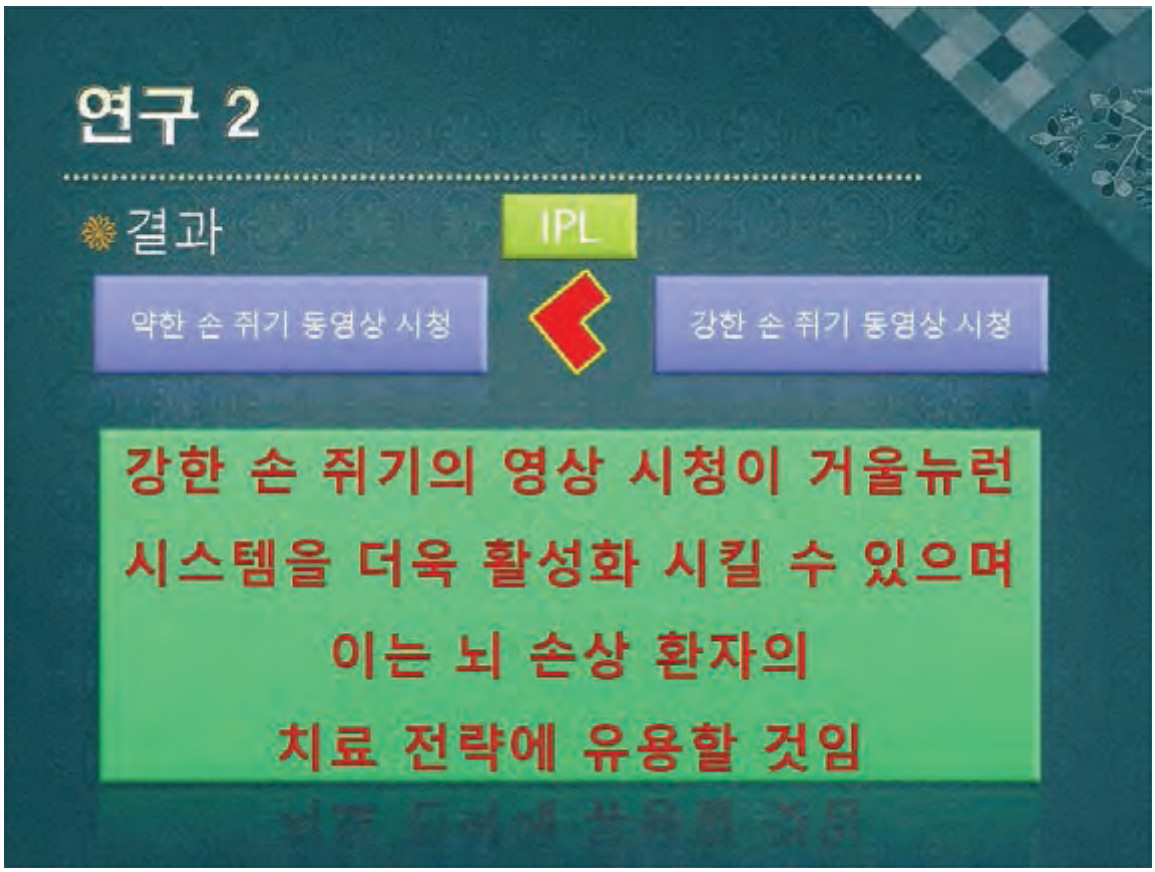
- 강한 손 쥐기와 약한 손 쥐기의 관찰 시 뇌활성화 비교

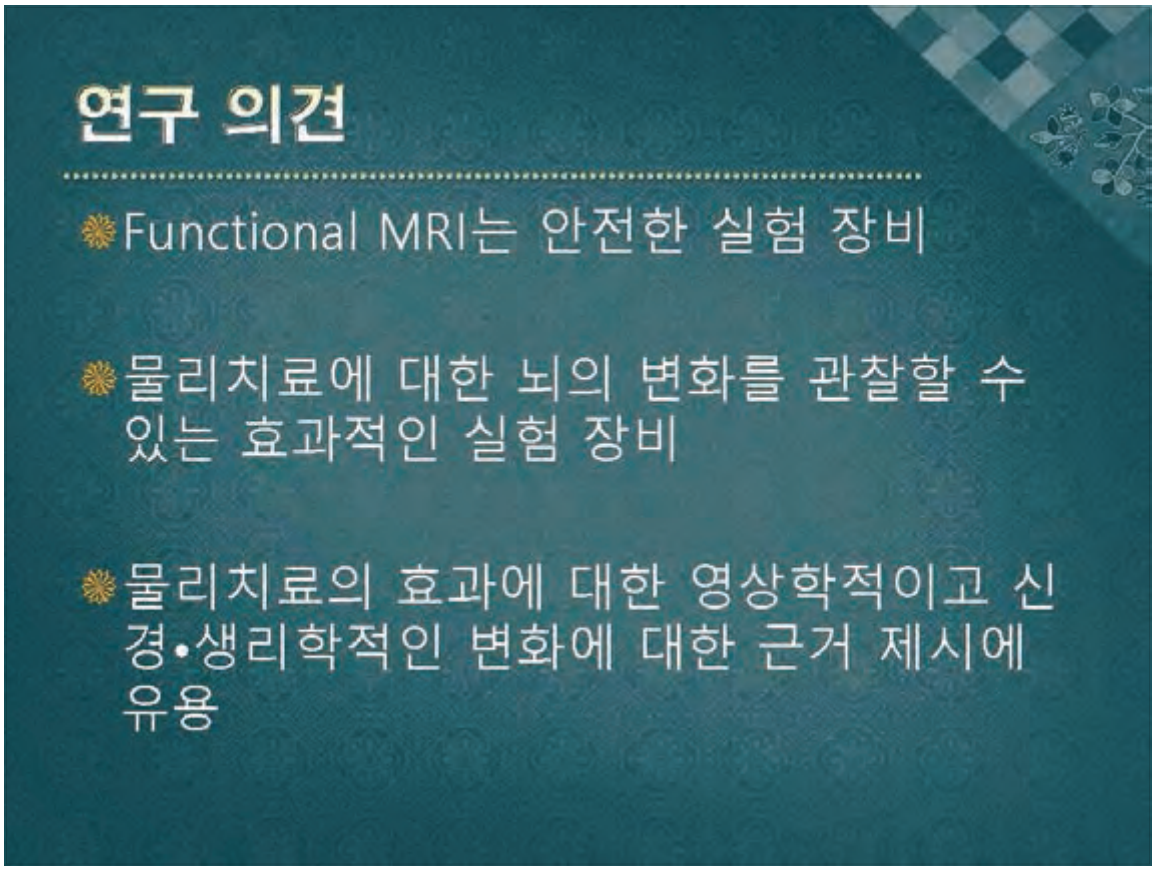
연구 2

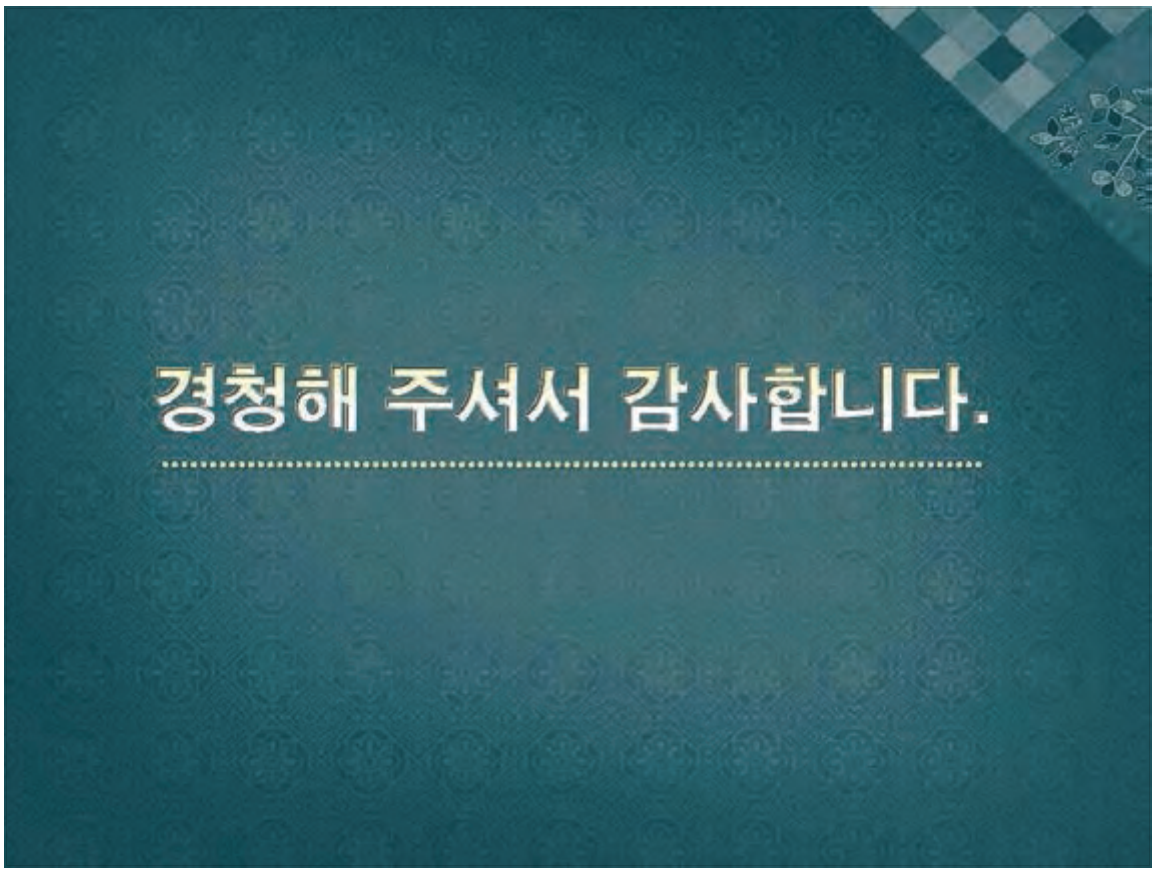
- 총 20명의 정상인

동영상 시청 동영상 시청


연구 2
Inferior parietal lobule (IPL)
Mirror neuron system의 핵심
Light grasp - observation
IPL
7.28
10
5
0
Rt
Lt
Powerful grasp - observation
IPL
8.25
15
10
5
0


연구 2
결과
IPL
약한 손 쥐기 동영상 시청
강한 손 쥐기 동영상 시청
강한 손 쥐기의 영상 시청이 거울뉴런
시스템을 더욱 활성화 시킬 수 있으며
이는 뇌 손상 환자의
치료 전략에 유용할 것임


연구 의견
Functional MRI는 안전한 실험 장비
물리치료에 대한 뇌의 변화를 관찰할 수 있는 효과적인 실험 장비
물리치료의 효과에 대한 영상학적이고 신경•생리학적인 변화에 대한 근거 제시에 유용


경청해 주셔서 감사합니다.

논문발표 2

Effects of Transcranial Direct Current Stimulation According to the Electrode Site on the Activity of Upper Limbs in Chronic Stroke Patients

/ Nam Seung-Min

Effects of Transcranial Direct Current Stimulation According to the Electrode Site on the Activity of Upper Limbs in Chronic Stroke Patients

Daegu University Department of Physical Therapy

Nam Seung-Min

1. Introduction

- Stroke is a disease that causes impairment of motor and cognitive function and loss of sensation in the body on the side opposite to the damaged cerebral hemisphere.

Bowen et al, 2013

- Especially the recovery of the performance of the upper extremities, with its many delicate movements such as gripping and manipulation, appears slow.

McCombe Waller & Prettyman, 2012

1. Introduction

- Brain plasticity is associated with the increased excitability of the cerebral cortex and synaptic efficiency, which is highly correlated with motor function.

Yamatom et al., 2011

- tDCS is the most representative noninvasive device that can directly stimulate the brain and change the excitability of brain nerve cells by promoting or suppressing the excitability of the brain.

de Aguiar et al., 2015

- Two electrodes are attached to the scalp, and they create a small current of about 1-2 mA, which increases the excitability of brain nerve cells at the anode electrode and decreases excitability at the cathode electrode.

Fusco et al., 2014

1. Introduction

- The application of an anode electrode to the primary motor sensory and premotor areas can enhance the motor function of the hand and promote implicit motor learning and working memory.

Krause et al, 2014

- While many studies have been conducted on the effect of an anode electrode on tDCS, research on the effects on a cathodal electrode is still insufficient.

Schauenburg et al., 2003

1. Introduction

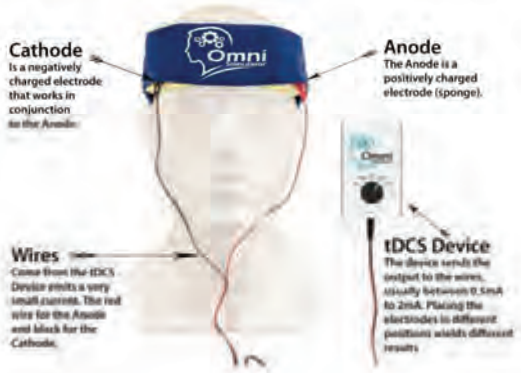
- The anode electrode, which increases the excitability of brain nerve cells, is attached to the primary motor area (M1) of the injured brain hemisphere, and the cathodal electrode, which suppresses excitation, is attached to the primary hemisphere of the undamaged brain hemisphere.

⇒ The activity of the brain hemispheres on the injured side is promoted.

Eisner et al, 2013

1. Introduction

◈ The purpose of this study was to investigate the effect of tDCS on both brains, to find out how it affects the upper extremity performance of stroke patients during dual and unilateral brain stimulation, and to confirm the relevance of stroke activity.



2. Materials and Methods

1. Participants

- The subjects in this study were patients diagnosed with hemiplegia due to unilateral brain injury following a stroke, they were hospitalized for chronic hemiplegia more than three months after onset.
- After receiving an explanation of the purpose and procedure of the study, 45 patients with stroke who agreed to participate were selected, and 35 completed the experiment.

2. Materials and Methods

2. Study design

- 15 patients were randomly designated the unilateral hemisphere M1 tDCS group, 15 were designated the dual hemisphere M1 tDCS group, and 15 were designated the sham stimulation group.
- An evaluation of upper extremity function was performed for all subjects before tDCS application, four weeks after tDCS, and two weeks after therapy.
- All evaluations were conducted using a doubleblind, randomized, sham control design that anonymized the patients randomly assigned to the three groups.

2. Materials and Methods

3. Intervention

- tDCS was performed for 4 weeks using a transcranial direct current stimulator, and a current of 1 mmA was applied for 20 minutes.

2. Materials and Methods

3. Intervention

- The anode electrode was placed on the left hemisphere primary motor area(C3) of the left hemisphere.

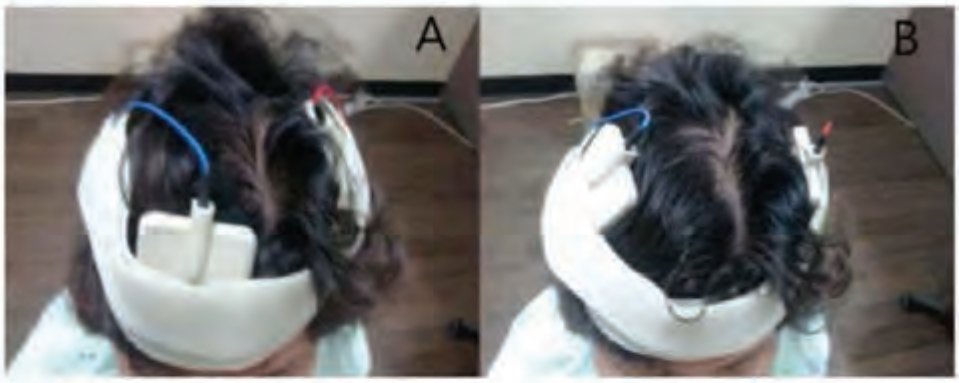
① The cathodal electrode is a reference electrode in the unilateral brain stimulation group; it is attached to the supraorbital area of the right hemisphere.

② In the dual brain stimulation group, the right hemisphere primary motor area of the undamaged brain hemisphere was attached on the C4 site.

③ In the placebo stimulation group, the same stimulator was used, but no current was applied.

- All subjects performed a gripping exercise using a sponge ball while the transcranial direct current electrical stimulation was energized.

2. Materials and Methods



A. Unilateral tDCS B. Dual tDCS

2. Materials and Methods

4. Outcome measure

① Hand grip strength test

- The hand grip strength test was performed using an electronic dynamometer.

- The measurement posture was sitting position on the chair, flexion the elbow joint at 90°

2. Materials and Methods

4. Outcome measure

② Modified Ashworth Scale(MAS)

- The MAS is the most commonly used six-step scale among clinical evaluation methods spasticity.

- This study examined the effected wrist and elbow joints.

Grade	Description
0	No increase in muscle tone
1	Slight increase in muscle tone, manifested by a catch and release or by minimal resistance at the end of the range of motion when the affected part(s) is/are moved in flexion or extension
1+	Slight increase in muscle tone, manifested by a catch, followed by minimal resistance throughout the remainder (less than half) of the ROM
2	More marked increase in muscle tone through most of the ROM, but affected part(s) easily moved
3	Considerable increase in muscle tone, passive movement difficult
4	Affected part(s) rigid in flexion or extension

2. Materials and Methods

4. Outcome measure

③ Jebsen Taylor hand function test

- The Jebsen Taylor hand function test was performed to evaluate the hand function.

- Measurements were made using a standardized stopwatch. the time it took to execute and perform the remaining six items (except for writing the sentences) was measured.

2. Materials and Methods

5. Statistical analysis

- A one-way ANOVA was performed to examine the differences between groups for the general characteristics of the subjects.
- A two-way repeated measured ANOVA was used to compare the change in dependent variables during the intervention period of brain stimulation according to the electrode placement of tDCS.
- Interaction variables were analyzed using a one-way ANOVA measure for the amount of change, and the least square difference (LSD) was used as a posttest.

3. Results

1. General and medical characteristics of subjects

	Sham-tDCS	Unilateral-tDCS	Dual-tDCS
Sex (male/female)	9/4	7/4	8/3
Etiology (Hemorrhge/Infaction)	7/6	6/5	5/6
Age	54.68 ± 7.72[a]	53.29 ± 7.94	55.87 ± 8.34
Height (cm)	166.38 ± 7.32	168.72 ± 8.47	167.76 ± 7.24
Weight (kg)	65.87 ± 8.64	66.75 ± 7.94	65.71 ± 6.92
Time onset (month)	8.38 ± 4.14	7.64 ± 4.97	8.75 ± 5.91

[a]Mean ± SD, tDCS: Transcranial Direct Current Stimulation

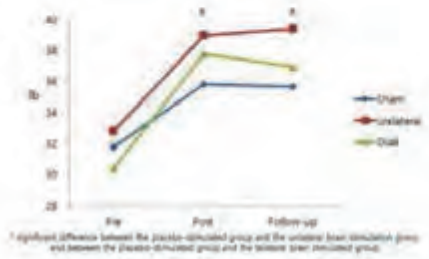
3. Results

2. Comparison of change in variables in each group

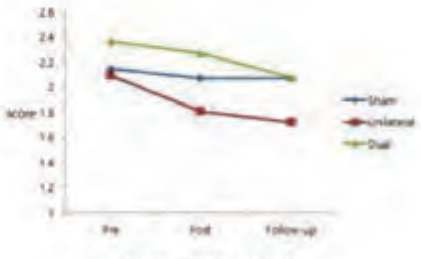
variables	Group	Pre	Post	Follow-up	p	F(p)		
						Group	Period	Group*Period
hand grip strength	Sham	31.73 ± 6.51[a]	35.80 ± 7.72	35.62 ± 7.05	.045*	2.87 (.072)	28.78** (.000)	2.61* (.044)
	Unilateral	32.78 ± 6.82	38.90 ± 8.31	39.36 ± 8.24	.025*			
	Dual	30.39 ± 5.69	37.74 ± 5.75	36.92 ± 5.92	.001*			
Elbow Flexor	Sham	1.92 ± 0.64	1.84 ± 0.68	1.76 ± 0.71	.224	0.63 (.542)	3.52* (.042)	0.65 (.632)
	Unilateral	1.82 ± 0.87	1.64 ± 0.80	1.55 ± 0.84	.113			
	Dual	2.09 ± 0.83	1.99 ± 0.77	1.81 ± 0.81	.157			
Wrist Flexor	Sham	2.15 ± 0.68	2.07 ± 0.64	2.07 ± 0.64	.452	1.00 (.379)	3.78* (.034)	1.35 (.263)
	Unilateral	2.09 ± 0.70	1.81 ± 0.75	1.72 ± 0.79	.124			
	Dual	2.36 ± 0.67	2.27 ± 0.75	2.08 ± 0.75	.174			
JTT	Sham	74.69 ± 11.97	71.38 ± 13.41	69.24 ± 12.17	.045*	1.20 (.314)	8.70** (.001)	2.92* (.028)
	Unilateral	77.54 ± 14.97	70.18 ± 10.89	67.24 ± 12.37	.009**			
	Dual	72.73 ± 16.22	67.54 ± 13.84	65.27 ± 10.97	.024*			

[a]Mean ± SD, *p< .05, **p< .01, Elbow Flexor: Elbow Flexor Muscle Tone, Wrist Flexor: Wrist Flexor Muscle Tone, JTT: Jebsen-Taylor hand function test

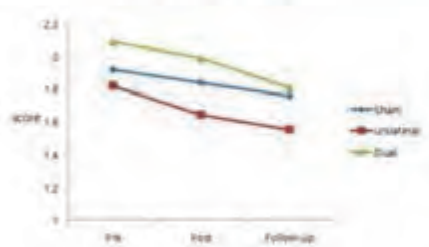
3. Results



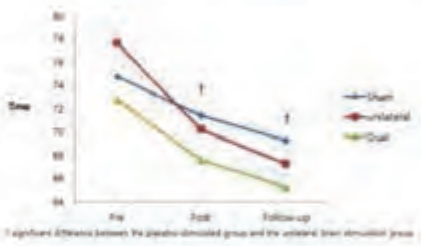
hand grip strength



Elbow flexor MAS



Elbow extensor MAS



JTT

4. Discussion

- In this study, the grip strength was significantly increased between the three testing periods in all groups, and the grip strength was significantly increased in the unilateral brain stimulation group and the bilateral brain stimulation group more than in the placebo-stimulated group.

① According to a previous study, which measured the change in the grip strength of stroke patients using bilateral brain stimulation and forced induction exercise therapy (CIMT), the group applying CIMT and tDCS together showed a significant increase in grip strength, which was consistent with the results of this study.

Bolognini et al., 2011

② When comparing the grip training group, the tDCS group, and the group that used both grip training and direct tDCS, the exercise potential and muscle strength were significantly higher than in the other two groups. The results were increased, and the results of this study were consistent.

Kim et al., 2006

4. Discussion

- There was no significant difference between pretreatment, posttreatment, and posttest in each of the three groups, and there was no significant difference between the groups.

① In previous studies, tDCS applied to chronic stroke patients with mild to moderate functional limitations in the upper extremity produced a decrease in muscle tone.

Bradnam et al., 2012

② It was reported that a ten-minute application of tDCS for five days to patients with severe chronic stroke showed a decrease in muscle tone.

Ochi et al., 2013

- The difference between this study and the previous ones is that the muscle strength exercise was applied simultaneously in this study, and the muscle strength exercise acted as a factor to increase muscle tone.

4. Discussion

- The execution time of the Jebsen Taylor hand function test was significantly decreased in all three testing times in all groups, and the execution time was significantly decreased in the unilateral brain stimulation group more than in the placebo stimulation group.

① According to a previous study, Jebsen Taylor hand function test execution time was reduced as a result of stimulating tDCS in M1 in chronic stroke patients twice for ten days.

Hummel et al., 2004

② As a result of applying tDCS for 20 minutes to the nondominant side M1 of normal people, a significant decrease in the execution time of the Jebsen Taylor hand function test was reported, which was consistent with the results of this study.

Boggio et al., 2006

- It is thought that the performance of the cortical activity increased with the application of tDCS.

4. Discussion

- The limitations of this study are as follows. First, it was difficult to generalize the results to all stroke patients. Further research is needed to investigate the effects of tDCS in specific types of stroke and with different severity levels.

- Second, the tDCS period was short. Further research will be needed to investigate changes in daily living performance through long-term, continuous tDCS.

5. Conclusion

- To summarize the results of this study, tDCS, which can directly enhance or suppress brain activity at a specific site, can be used in conjunction with other exercises and is easy and effective in improving the function and performance of stroke patients.
- But a clear mechanism for efficacy of the application site and the effect has not been established, and the effect of the use of the cathode is unclear.
- Despite these inadequacies, it is considered a therapeutic approach that can be used for a variety of purposes.

Thank you for your attention

논문발표 3

Association between restrictive pulmonary disease and type 2 diabetes in Koreans: A cross-sectional study

/ 이도연

Association between restrictive pulmonary disease and type 2 diabetes in Koreans : A cross-sectional study

이 도 연

Contents

- Introduction
- Materials and Methods
- Results
- Discussion
- Conclusion

Introduction

- Diabetes is a progressive disease that increases glucose levels in the blood and has several pathogeneses, including insulin resistance in the liver and dysfunction of pancreas beta cells.
- Type 2 diabetes mellitus(T2DM) is a complex disease associated with increased risk of multiple complications, such as peripheral circulation disease, and cardiovascular diseases such as stroke and coronary artery disease requiring intervention for treatment and prevention.

Introduction

- Moreover, in a recent study, the risk of pulmonary dysfunction was higher in patients with impaired fasting glucose levels.
- In addition, subjects with T2DM decreased forced expiratory volume in 1 s (FEV1) and forced vital capacity (FVC) regardless of race.

Introduction

- There are restrictive and obstructive pulmonary diseases in impaired pulmonary function.
- Restrictive pulmonary disease (RPD) is reduced in both forced vital capacity (FVC) and forced expiratory volume 1 (FEV1), resulting from a defect in thoracic compatibility.
- On the other hand, obstructive pulmonary disease (OPD) is known to be caused by a significant reduction in FEV1, mainly due to airway blockages associated with smoking.

Introduction

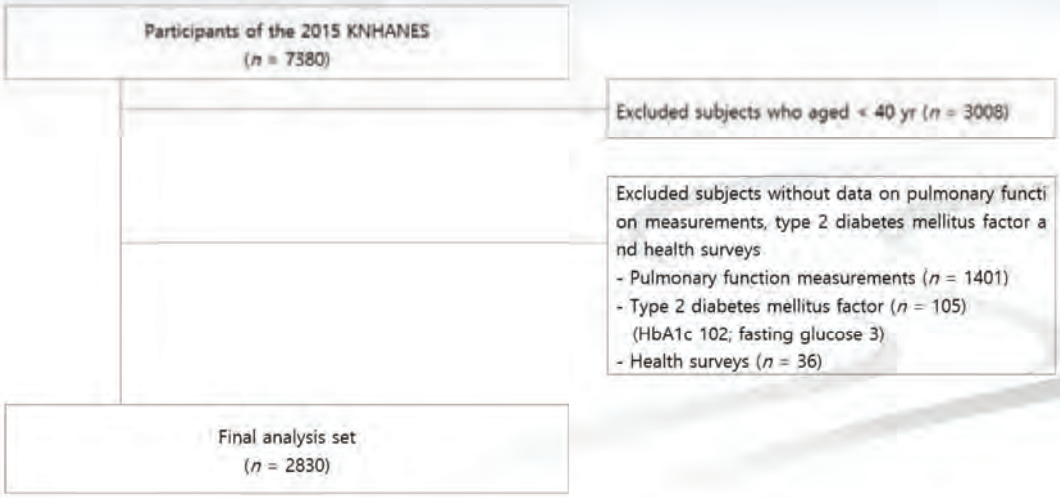
- According to previous studies, impaired pulmonary function causes insulin resistance.
- In addition, an increase in the inflammatory response derived from obesity causes insulin resistance and increases the risk of cardiovascular disease associated with obesity.
- It was shown in previous studies that the prevalence rate of T2DM in COPD patients is high, whereas it is more related to RPD than COPD.

Introduction

- As such, the association between T2DM and impaired pulmonary function is not consistently explained.
- In addition, it is not clear whether this association is mediated by insulin resistance or by other factors.
- Therefore, based on the cross-sectional data from a large number of Korean subjects, this study examined the association between RPD and OPD with insulin resistance and T2DM.

Materials and Methods

- *Data source and sampling*



Materials and Methods

- *Measurements of variables*
  - Cigarette smoking condition
    - never smokers, ex-smokers, current smokers
  - drinking condition
    - current users and non-users
  - Physical examinations
    - Body mass index (BMI), waist circumference(WC), diastolic & systolic blood pressure(DBP & SBP), total cholesterol(TC), low density lipoprotein(LDL), high density lipoprotein-cholesterol(HDL), triglyceride

Materials and Methods

- *Measurements of variables*
  - *T2DM and insulin resistance*
    - HbA1c, C-reactive protein (hs-CRP), fasting insulin, fasting glucose level, HOMA-IR, HOMA-beta
    - T2DM : Fasting glucose levels > 126 mg/dL
    - IFG(impaired fasting glucose)
      - Fasting glucose levels ≥ 100 mg/dL & < 125 mg/dL
  - *Measurement of pulmonary function*
    - Normal group : FEV 1/FVC ≥ 0.70, FVC ≥ 80% predicted
    - OPD group : FEV 1/FVC < 0.70
    - RPD group : FVC < 80% predicted, FEV 1 / FVC ≥ 0.70

Characteristics of individuals with normal, RPD, and OPD

	Normal, n = 2177	RPD, n = 251	OPD, n = 402
Age (yr)[1]	53.50 ± 0.27[a]	57.79 ± 0.81[b]	62.40 ± 0.65[c]
Male (%)[1]	45.1[a]	50.8[b]	78.9[c]
T2DM (%)[1]	7.9[a]	21.1[b]	12.2[c]
HOMA-IR[1]	2.10 ± 0.07[a]	3.13 ± 0.41[b]	2.21 ± 0.14[a]
HOMA-beta[1]	78.51 ± 2.50[a]	83.13 ± 4.07[a]	76.23 ± 3.83[a]
HbA1c (%)[1]	5.71 ± 0.02[a]	6.14 ± 0.09[b]	5.93 ± 0.06[a]
Hs-CRP (mg/L)[1]	1.07 ± 0.05[a]	1.79 ± 0.19[b]	1.48 ± 0.17[b]
Fasting insulin (UIU/mL)[1]	7.80 ± 0.16[a]	9.84 ± 0.61[b]	8.07 ± 0.43[a]
BMI (kg/m^2)[1]	24.08 ± 0.07[a]	25.67 ± 0.23[b]	24.08 ± 0.16[a]
Fasting glucose (mg/dL)[1]	101.99 ± 0.67[a]	116.33 ± 3.64[b]	105.85 ± 1.62[c]
Waist circumference (cm)[1]	82.97 ± 0.22[a]	87.59 ± 0.60[b]	86.29 ± 0.45[b]
SBP (mmHg)[1]	119.46 ± 0.42[a]	123.83 ± 1.27[b]	124.47 ± 0.85[b]
DBP (mmHg)[1]	77.22 ± 0.26	76.53 ± 0.86	76.27 ± 0.659
Total cholesterol (mg/dL)[1]	197.35 ± 0.89[a]	190.21 ± 2.59[b]	191.86 ± 2.43[b]
LDL-cholesterol (mg/dL)[1]	118.97 ± 0.81[a]	114.61 ± 2.21[b]	116.41 ± 2.37[b]
HDL-cholesterol (mg/dL)[1]	50.73 ± 0.34[a]	47.97 ± 0.88[b]	46.62 ± 0.68[b]
Triglyceride (mg/dL)[1]	148.73 ± 3.28[a]	155.62 ± 11.25[b]	157.15 ± 7.17[b]
Smoking status (%) (non-/ex-/current smoker)[1]	57.6/24.2/18.3[a]	56.7/25.3/18.0[a]	30.8/40.3/28.9[b]
Drinking alcohol status (%) (non-/current drinking)	25.6/74.4	30.5/69.5	23.3/76.7
FVC (% predicted)[1]	3.69 ± 0.02[a]	2.88 ± 0.04[b]	3.83 ± 0.07[a]
FEV1 (L)[1]	2.93 ± 0.02[a]	2.29 ± 0.04[b]	2.48 ± 0.05[c]
FEV1/FVC[1]	0.80 ± 0.00[a]	0.80 ± 0.00[a]	0.64 ± 0.00[b]
PEF (L/s)[1]	7.75 ± 0.06[a]	6.55 ± 0.12[b]	6.67 ± 0.11[b]

Characteristics of individuals with pulmonary function in normal, IFG, and T2DM

	Normal, n = 1608	IFG, n = 934	T2DM, n = 288
Age (yr)[1]	53.63 ± 0.31[a]	56.23 ± 0.40[b]	58.95 ± 0.71[c]
Male (%)[1]	42.9 ± 1.3[a]	58.2 ± 1.7[b]	62.0 ± 3.5[b]
RPD/OPD (%)[1]	6.2/11.5[a]	8.4/13.3[b]	18.1/15.9[c]
HOMA-IR[1]	1.45 ± 0.03[a]	2.49 ± 0.06[b]	5.52 ± 0.58[c]
HOMA-beta[1]	84.75 ± 1.58[a]	76.38 ± 1.93[b]	48.56 ± 3.96[c]
HbA1c (%)[1]	5.47 ± 0.01[a]	5.79 ± 0.02[b]	7.61 ± 0.12[c]
Hs-CRP (mg/L)[1]	0.94 ± 0.04[a]	1.34 ± 0.09[b]	2.04 ± 0.30[c]
Fasting insulin (UIU/mL)[1]	6.42 ± 0.12[a]	9.35 ± 0.24[b]	13.02 ± 1.05[c]
BMI (kg/m^2)[1]	23.63 ± 0.08[a]	24.97 ± 0.11[b]	25.19 ± 0.22[b]
Fasting glucose (mg/dL)[1]	90.84 ± 0.16[a]	107.44 ± 0.26[b]	168.79 ± 3.34[c]
Waist circumference (cm)[1]	81.52 ± 0.24[a]	86.44 ± 0.31[b]	88.32 ± 0.57[c]
SBP (mmHg)[1]	117.92 ± 0.46[a]	123.00 ± 0.58[b]	126.55 ± 1.14[c]
DBP (mmHg)[1]	76.39 ± 0.32[a]	78.18 ± 0.39[b]	77.10 ± 0.75[c]
Total cholesterol (mg/dL)[1]	196.00 ± 0.96[a]	198.67 ± 1.46[a]	186.82 ± 2.73[b]
LDL-cholesterol (mg/dL)[1]	118.77 ± 0.91[a]	120.50 ± 1.30[a]	107.90 ± 2.26[b]
HDL-cholesterol (mg/dL)[1]	51.71 ± 0.39[a]	48.25 ± 0.46[b]	45.30 ± 0.72[c]
Triglyceride (mg/dL)[1]	130.65 ± 3.08[a]	166.09 ± 5.44[b]	216.02 ± 15.20[c]
Smoking status (%) (non-/ex-/current smoker)[1]	59.9/22.1/18.0[a]	46.6/32.0/21.4[b]	45.6/31.7/22.8[b]
Drinking alcohol status (%) (non-/current drinking)	26.4/73.6	23.6/76.4	28.9/71.1
FVC (% predicted)[1]	3.61 ± 0.26[a]	3.72 ± 0.04[a]	3.56 ± 0.07[a]
FEV1 (L)[1]	2.81 ± 0.02[a]	2.86 ± 0.03[a]	2.72 ± 0.05[b]
FEV1/FVC[1]	0.78 ± 0.00[a]	0.77 ± 0.00[a]	0.77 ± 0.01[a]
PEF (L/sec)[1]	7.42 ± 0.06[a]	7.73 ± 0.09[b]	7.48 ± 0.15[a]

Odds ratios for pulmonary function according to the fasting glucose level by multivariate logistic regression analysis

	Pulmonary disease	Fasting glucose odds ratio (95%CI)	
		IFG (100-125)	T2DM (≥ 126)
Model 1	RPD	1.453 (1.059-1.995)[a]	3.621 (2.316-5.663)[a]
	OPD	1.199 (0.888-1.619)	1.744 (1.164-2.614)[a]
Model 2	RPD	1.282 (0.939-1.749)	2.890 (1.810-4.616)[a]
	OPD	0.725 (0.518-1.014)	0.821 (0.525-1.284)
Model 3	RPD	1.074 (0.781-1.476)	2.316 (1.438-3.729)[a]
	OPD	0.699 (0.498-0.982)	0.796 (0.501-1.267)
Model 4	RPD	0.934 (0.638-1.369)	1.907 (1.110-3.277)[a]
	OPD	0.722 (0.512-1.019)	0.782 (0.484-1.263)

Model 1: Crude

Model 2: Adjusted for age, sex

Model 3: Adjusted for variables in Model 2 + body mass index, waist circumference, smoking status

Model 4: Adjusted for variables in Model 3 + C-reactive protein, homeostasis model assessment-IR.

Odds ratios for T2DM according to the pulmonary function by multivariate logistic regression analysis

	Pulmonary disease	Odds ratio	95%CI
Model 1	RPD	3.127[b]	2.056-4.756
	OPD	1.631[a]	1.103-2.412
Model 2	RPD	2.580[b]	1.670-3.988
	OPD	1.033	0.673-1.584
Model 3	RPD	2.257[b]	1.465-3.475
	OPD	0.984	0.633-1.531
Model 4	RPD	2.025[a]	1.264-3.244
	OPD	0.982	0.634-1.519

Model 1: Crude

Model 2: Adjusted for age, sex

Model 3: Adjusted for variables in Model 2 + body mass index, waist circumference, smoking status

Model 4: Adjusted for variables in Model 3 + C-reactive protein, homeostasis model assessment-IR.

Discussion

- This cross-sectional study is intended to identify the association of abnormal glucose in pulmonary disease.
- In particular, RPD was highly associated with increased ORs of T2DM regardless of major potential confounds, such as age and obesity factors.
- Thus, the main findings of this study are that T2DM is highly related to RPD but not OPD.

Discussion

- HbA1c, measured for diagnosis of T2DM and monitoring glucose control, is a risk factor for cardiovascular disease.
- In this study, the HbA1c level of the RPD was the highest compared to normal and OPD(5.71 vs 6.14 vs. 5.93).
- These results are consistent with the results of a prior study that shows a link between HbA1c and reduced pulmonary function in diabetics. Moreover, the high level of HbA1c in healthy individuals means poor lung capacity, especially RPD.

Discussion

- Although pathological mechanisms for explaining the association between reduced pulmonary function and insulin resistance and T2DM have not been identified, there may be several common underlying causes.
  - First, insulin resistance and hyperglycemia, the main risk factors for T2DM, caused decreased pulmonary function.
  - Second, the accumulation of fat in the abdominal cavity reduces lung volume and decreases the motion of the diaphragm, so the pulmonary function is likely to be reduced.
  - Third, systemic inflammatory responses with insulin resistance lead to reduced pulmonary function and the development of diabetes.

Discussion

- To summarize, the results of this study can see that there was a significant association between RPD and T2DM, whereas IFG was weak or not.
- This suggests that T2DM is not a results of RPD, rather the cause of T2DM.
- Thus, it can be seen that risk factors such as HOMA-IR, HbA1c, hyperglycemia, abdominal fat, and inflammatory index hs-CRP are not sufficient in IFG to cause RPD compared to T2DM.

Conclusion

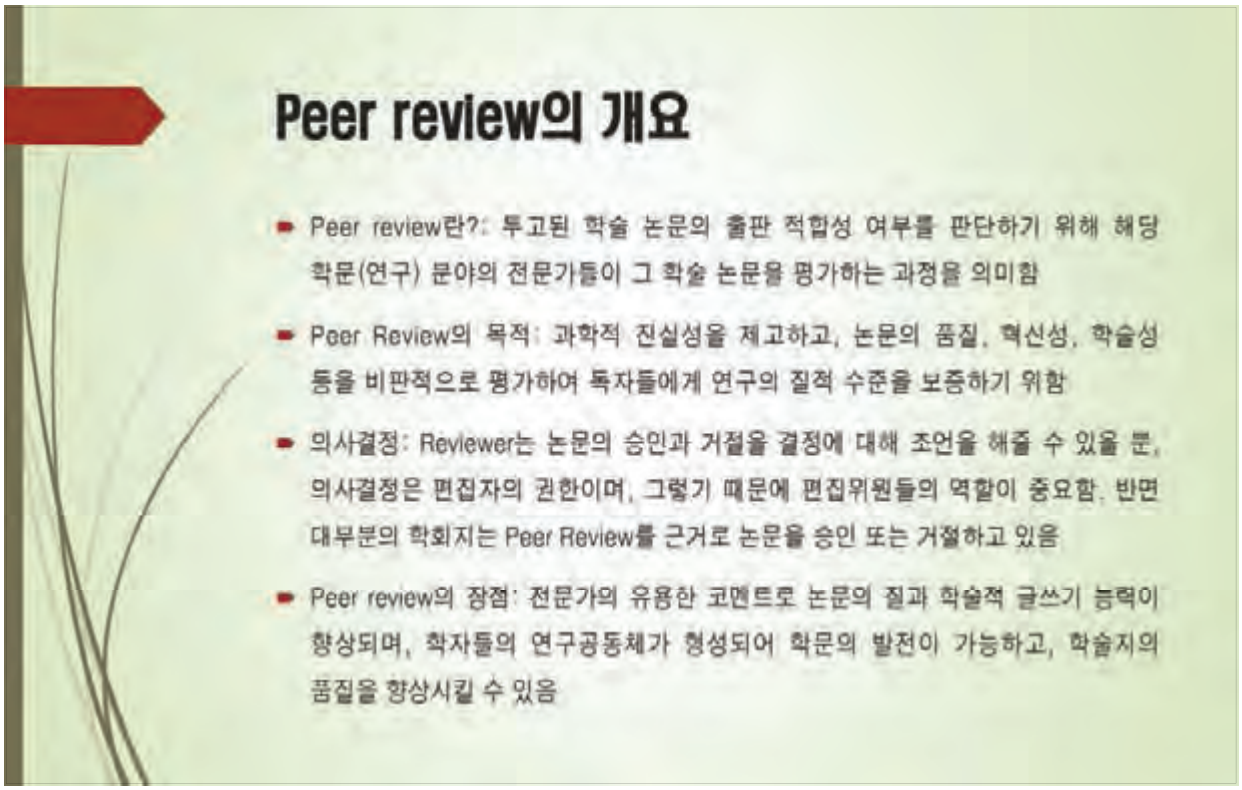
- The results of this study found that restrictive pulmonary function, not obstructive pattern, is highly relevant to T2DM regardless of the risk factors of various T2DMs that can be mediated or confused.

연구윤리

심사자의 역할과 책임
(Reviewer's role and responsibility)

/ 한동욱


심사자의 역할과 책임
(Reviewer's role and responsibility)
한동욱
신라대학교


Peer review의 개요
Peer review란?: 투고된 학술 논문의 출판 적합성 여부를 판단하기 위해 해당 학문(연구) 분야의 전문가들이 그 학술 논문을 평가하는 과정을 의미함
Peer Review의 목적: 과학적 진실성을 제고하고, 논문의 품질, 혁신성, 학술성 등을 비판적으로 평가하여 독자들에게 연구의 질적 수준을 보증하기 위함
의사결정: Reviewer는 논문의 승인과 거절을 결정에 대해 조언을 해줄 수 있을 뿐, 의사결정은 편집자의 권한이며, 그렇기 때문에 편집위원들의 역할이 중요함. 반면 대부분의 학회지는 Peer Review를 근거로 논문을 승인 또는 거절하고 있음
Peer review의 장점: 전문가의 유용한 코멘트로 논문의 질과 학술적 글쓰기 능력이 향상되며, 학자들의 연구공동체가 형성되어 학문의 발전이 가능하고, 학술지의 품질을 향상시킬 수 있음

Peer review 과정

Peer review의 문제점

- 심사자 마다 관점과 기준이 다르고, 심사 논문 관련 전문성이 미흡한 경우도 있음
- 심사에 소요되는 노력과 에너지, 시간 등 보이지 않은 비용이 큼
- 심사가 더디고 길어져 연구자에게 시간 낭비가 발생
- 이해상충으로 조작, 봐주기, 도용(표절) 등이 발생할 가능성이 있음
- 성별, 국적, 기관, 언어, 주제 분야, 긍정 결과 위주의 출판 등에 대한 편견이 반영될 우려가 있음
- Peer Review에 대한 보상이 거의 없어서 동기부여가 어려움
- 저자를 고려하지 않은 무성의, 심한 비판 등으로 저자의 마음에 상처를 줌
- 소수의 학자가 대다수의 논문을 심사하므로 업무 부담이 증가


Peer review의 유형
Main editor peer review (편집장 동료 심사)
Single blind peer review (싱글 블라인드 동료 심사)
Double blind peer review (더블 블라인드 동료 심사)
Open peer review (공개 동료 심사)
Collaborative peer review (공동 동료 심사)
Third party peer review (제3자 동료 심사)
Post publication peer review (출판 후 동료 심사)
Cascading peer review (계단식 동료 심사)


Peer review의 유형
Main Editor Peer Review
• 학술지의 핵심 편집인이 투고 논문의 출판 적합성을 검토
• 다른 동료심사자의 검토 없이 출판
Pros
• 심사기간이 단축되고 학술지 출판 기간이 단축됨
Cons
• 편집인의 편향성이 나타날 수 있음
• 편집인의 심리적 스트레스와 업무 부담이 증가


Peer review의 유형
Single Blind Peer Review
• 심사자들이 출판의 적합성 여부를 검토
• 심사자들은 투고 논문의 저자를 알고 있지만 논문의 저자는 심사자들이 누구인지를 모름
Pros
• 저자의 비판을 두려워하지 않고 정직하게 심사
• 저자를 알면 저자의 이전 연구에 대한 지식을 활용할 수 있음
Cons
• 저자를 알게 되면 논문 수준을 제대로 볼 수 없음
• 성별이나 국적에 따른 차별의 가능(비영어권 저자)


Peer review의 유형
Double Blind Peer Review
• 심사자들이 출판의 적합성 여부를 검토
• 심사자들과 투고 논문의 저자 모두 서로를 모름
Pros
• 편견을 배제하고 공정하게 판단할 수 있음
• 저자와 심사자 모두 비판으로부터 일정 수준의 보호를 받을 수 있음
Cons
• 익명성이 보장되지 않음
• 심사자가 저자를 알면 더 많은 정보를 근거로 판단이 가능한데 이것이 없으면 심사자가 고통을 받게 됨

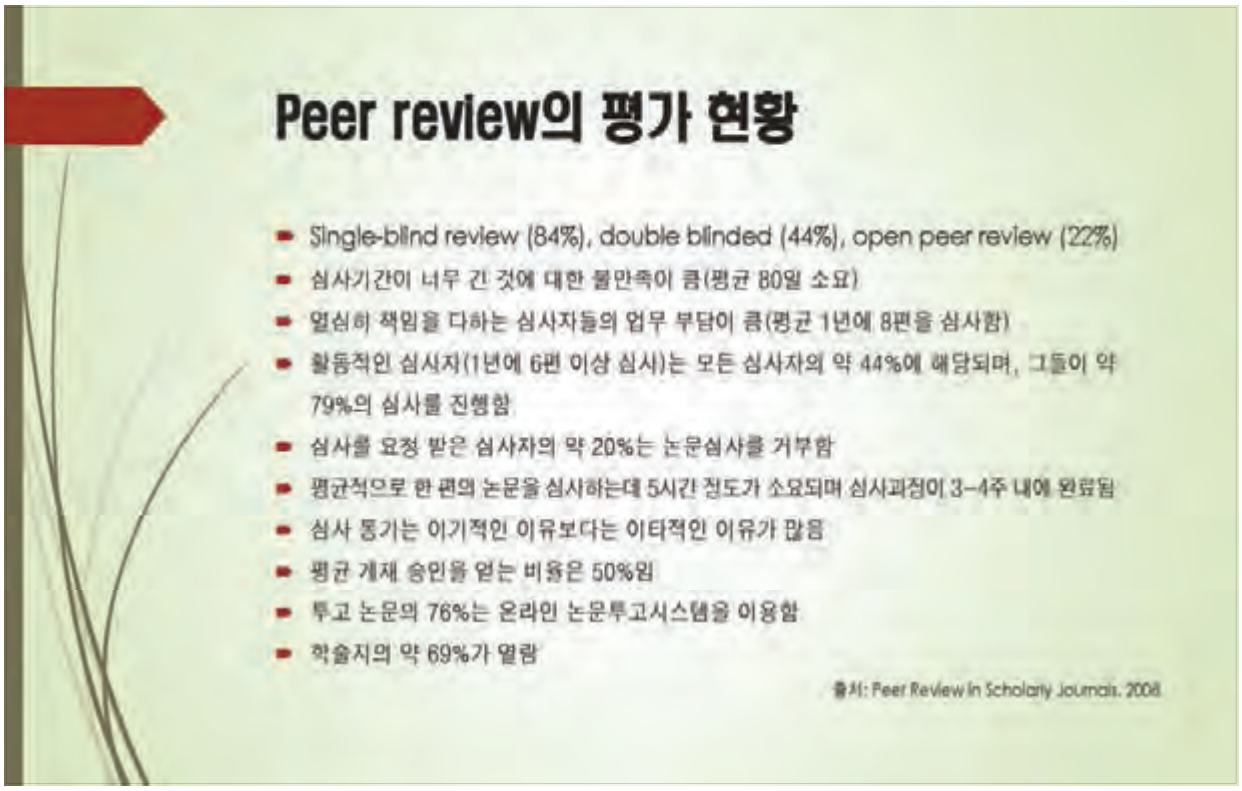

Peer review의 유형
Open Peer Review
• 논문의 저자와 심사자 모두 각각 상대가 누구인지를 알고 있음
• 심사자의 심사평과 저자의 답변이 논문 초고와 함께 출판됨
Pros
• 투명성 확보로 투고 논문에 대한 심사를 책임성 있게 수행하려는 동기를 유발할 수 있음
Cons
• 심사자의 심사 의견이 부정적으로 사용될 수 있다는 우려로 심사 참여를 꺼려할 수 있음
• 선배 연구자나 저명한 저자의 논문에 대한 심사에 부담을 느껴 피하려고 할 수 있음


Peer review의 유형
Collaborative Peer Review
• 학술지는 논문 초고가 어떻게 개선될 수 있을지에 대해 심사자와 저자가 토론할 수 있는 플랫폼을 제공
• 심사자의 신원이 저자에게 공개되지 않지만, 출판될 때는 공개됨
Pros
• 동료 심사에 대한 기존 접근보다 더 건설적이고 덜 제한적으로 느낌
• 논문 저자와 심사자 간의 장벽을 해소할 수 있음
Cons
• 2개 이상의 독립적인 평가를 받을 기회를 상실하게 됨
• 논문 작성과 심사(평가)의 차이를 모호하게 함


Peer review의 유형
Third Party Peer Review
• 논문 초고를 학술지에 투고하기 전 저자는 학술지 소속이 아닌 별도의 독립적인 심사자에게 검토를 받음
• 이 검토를 근거로 논문을 수정하고 출판을 위해 학술지에 투고함
Pros
• 학술지 소속 심사위원들의 업무 부담이 줄어듦
• 논문 투고 전에 연구의 미흡한 점을 보충할 수 있음
Cons
• 투고하고자 하는 학술지의 목적과 다르게 수정될 수 있음


Peer review의 유형
Post Publication Peer Review
• 학술지는 출판 이후에 코멘트 등 토론의 장(discussion forum)이 가능한 플랫폼을 제공
• 논문 초고가 포럼에 공개되면 초고를 읽은 사람은 누구나 코멘트를 하고, 다른 사람들이 모든 정보를 볼 수 있음
Pros
• 발전하는 지식의 특성을 반영하여 논문을 수정하거나 개선할 수 있는 기회 제공이 가능함
Cons
• 출판 후 논문 수정은 이전 문헌 인용을 통해 새로운 연구를 맥락화하는 '기록' 의 개념과 맞닿을 수 없음


Peer review의 유형
Cascading (Transferable) Peer Review
• 투고 논문의 출판이 거절될 때, 저자가 논문 초고를 심사 내용과 함께 다른 학술지에 투고할 수 있도록 제안 받음
• 검토 내용에 근거하여 논문 초고는 동일한 출판사의 다른 학술지에서 출판을 고려할 수 있음
Pros
• 논문 저자에게 작업에 대한 대체 수단을 즉시 제공하여 잠재적으로 출판 과정을 가속화 시킴
• Family journal 내에서 작업 유지, 동료심사자의 부담 감소
Cons
• 수신 저널의 편집자가 원고를 받는 것에 부담을 느낌
• 대체 저널의 편집자가 출판을 거부할 때 저자에게 실망을 줌

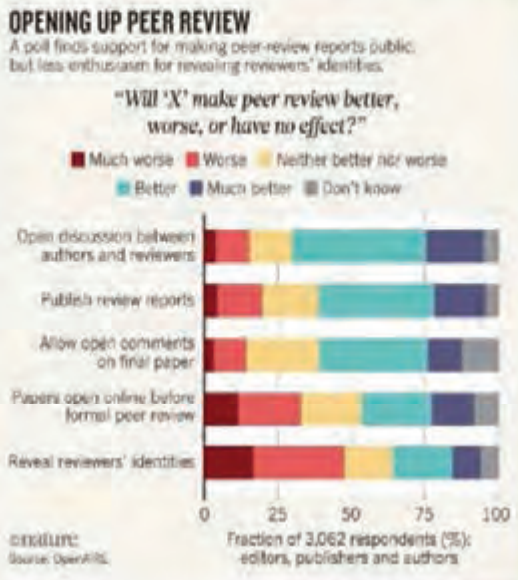

Peer review의 평가 현황
Single-blind review (84%), double blinded (44%), open peer review (22%)
심사기간이 너무 긴 것에 대한 불만족이 큼(평균 80일 소요)
열심히 책임을 다하는 심사자들의 업무 부담이 큼(평균 1년에 8편을 심사함)
활동적인 심사자(1년에 6편 이상 심사)는 모든 심사자의 약 44%에 해당되며, 그들이 약 79%의 심사를 진행함
심사를 요청 받은 심사자의 약 20%는 논문심사를 거부함
평균적으로 한 편의 논문을 심사하는데 5시간 정도가 소요되며 심사과정이 3-4주 내에 완료됨
심사 동기는 이기적인 이유보다는 이타적인 이유가 많음
평균 게재 승인을 얻는 비율은 50%임
투고 논문의 76%는 온라인 논문투고시스템을 이용함
학술지의 약 69%가 열람
출처: Peer Review in Scholarly Journals, 2008

Peer review의 평가 현황

- 'Peer review 없이 과학적인 의사소통의 방법이 없다'라는 항목에 그렇다는 응답이 2008년에 83%이었고, 2015년에는 82%로 조사됨
- 'Peer review는 논문의 질을 향상시킨다'라는 항목에 그렇다는 응답이 2009년에 77%이었고, 2015년에는 74%로 조사됨
- Peer review의 효과; 논문의 질 향상(74%), 원고의 독창성 결정(63%), 연구결과 중요성(59%)을 분별하는데 강한 효과가 있고, 반면 논문의 사기(41%)와 표절(44%) 확인 효과는 저조함, 따라서 사기와 표절을 찾아낼 수 있는 역량을 함양해야 함
- 저자와 심사자 모두 Pre-publication, Single or Double blind peer revie를 선호하고 있었으며, 심사자의 입장에서 Open peer review를 꺼려하고 있었음
- 활동적인 심사자(한 달에 1편 이상 심사)가 72%를 심사하고 편당 평균 5시간 소요됨

출처: Peer Review in Scholarly Journals, 2015

Peer review 공개 관련 인식도 조사



Peer reviewer의 책임

- 심사자는 **과학적 근거를 제시**하면서 투고된 논문의 학문적 장점, 과학적 가치와 편향되지 않은 건설적인 피드백을 **약속된 시간** 내에 제출해야 함(논문 **관련 분야 전문가**이어야 함)
- 글이 명확하고, 간결하며, 논문의 구성이 타당한지, 과학적으로 정확하고, 독창성이 있는지, 독자들이 이해할 수 있는지 등에 대해 언급함
- 개인적 의견이나 비평은 가능한 피해야 함
- 심사과정에 대한 비밀을 유지해야 함: 제 삼자와 정보를 공유하거나 논의해서는 안되며, 심사 논문에서 얻은 정보를 공개하거나 표절해서는 안됨
- 논문을 **시간 내 심사**할 수 없는 경우 즉시 편집자에게 통지하고, 할 수 있다면 대체 심사자를 추천할 수 있음
- 논문과 관련 **이해상충** 문제가 있는 경우 편집자에게 통지하고 심사를 보류해야 함
- 학회지의 심사 규정을 숙지하고 지침을 준수해야 함
- 투고된 논문에 대해 신중하고, 공정하며, 건설적인 비평을 제공해야 함
- 심사한 논문의 승인, 수정, 불가를 편집자에게 알려주어야 함

Peer review 시스템의 발전을 위한 제안

- 심사자들에게 Peer Review의 목적이 투고된 논문에서 과학적 연구의 결함을 찾고 건전한 비판을 통해 학문 발전에 기여한다는 인식을 갖도록 교육하는 것이 필요함
- 심사자의 역할과 책무, 소명의식을 고취시켜야 함
  - ▷ 심사의 공정성, 객관성 확보
  - ▷ 심사 시간 엄수
  - ▷ 심사 내용의 질 제고
  - ▷ 지속적인 출판 윤리 교육
- Peer Review 시스템의 개선
  - ▷ 심사과정을 이해할 수 있도록 목표와 방법 등을 공지(가능하면 예시나 자료를 제시)
  - ▷ 교육을 통한 질 관리 강화
  - ▷ Peer Reviewer Pool 확대
  - ▷ 심사자의 심사 내용을 학술지에 함께 게재
  - ▷ 사전 검토(pre-print) 제도 활용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초록

걷기운동과 밴드저항운동을 이용한 복합운동 적용이 골감소증 여성노인의 심혈관계 위험인자 및 혈관 기능과 골밀도에 미치는 영향

방현수†

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The Effects of Combined Exercise Using Walking and Band Resistance Exercising on Cardiovascular Risk Factors, Vascular Function and Bone Mineral Density in Elderly Women with Osteopenia

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〈Abstract〉

Purpose: The purpose of this study was to assess the effect of the combined walking and band resistance exercising on vascular function, bone mineral density, traditional CVD risk factors and cardiorespiratory fitness in older women.

Methods: The Twenty subjects(age 67±3 yrs, female) were randomly assigned to a combined exercise group(n=10) and a controled group(n=10) using walking and band resistance exercising for Osteopenia elderly women with t-score ranging from -1.0 to -2.5, performed exercise for 12 weeks, three times a week, 60 minutes a day. Body weight, lipid profiles, insulin resistance(HOMA index), high sensitivity C-reactive protein(hs-CRP), Bone Mineral Density(BMD) and cardiorespiratory fitness were measured at baseline and after 12 weeks intervention.

Results: After the 12 weeks combined walking and band resistance exercising, body weight, blood pressure and lipid profiles did significantly change in the exercise group compared with the control. And hs-CRP(1.73±0.3 to 1.12±0.3 mg/L, $p<.05$) and HOMA index (0.57±0.5 to 0.35±0.3, $p<.05$) were significantly improved in the exercise group. Also, cardiorespiratory fitness (23.1±2.9 to 26.1±4.8 ml/kg/min, $p<.05$) and Bone Mineral Density(-1.88±0.7 to -1.83±0.6 T, $p<.05$) were significantly increased in the exercise group.

Conclusion: These data indicate that Combined Exercise Using Walking and Band Resistance Exercising reduces hs-CRP level and improves cardiorespiratory fitness, Bone Mineral Density, insulin sensitivity and carotid artery function in older women and these effects are not dependent on changes in traditional CVD risk factors.

Key Words: Walking and Band Resistance Exercise, Cardiovascular Risk Factors, Osteopenia

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경사침대 타입의 로봇 운동 시스템(Erigo)에서의 속도 변화에 따른 운동이 뇌졸중 환자의 폐 기능 회복에 미치는 영향

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The effect robotic assisted tilt table training system (Erigo) with change of cadence on cardiopulmonary fitness inpatients with stroke

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Department of Physical Therapy, KOREA University

〈Abstract〉

Purpose: This study investigated to find the cardiopulmonary function according to robotic assisted tilt table training system(Erigo) cadence in stroke.

Methods: The subjects of this study were 24 stroke patients was exercised with robotic assisted tilt table training system for 10 times, all of whom agreed to participate in the study. All subjects were measured the values of changes in FVC, FEV1, PEF. In order to assure the statistical significance of the results, we used for SPSS ver.25 for windows.

Results: The results of this study were as follows: 1) There were statistically significant difference within group FEV. however, there was no significant difference between group. 2) The values of PEF within group and between groups increased, but no significant difference.

Conclusion: According the results of this study, robotic assisted tilt table training system is a suitable therapy for improving cardiopulmonary function and strengthening lung muscles. however, there is no significant difference in cardiopulmonary function.

Key Words: robotic assisted tilt table training system, erigo, cadence, cardiopulmonary function

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골반압박벨트를 적용한 몸통 안정화 운동이 뇌졸중 환자의 균형 및 보행능력에 미치는 영향

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The effects of trunk stabilization exercise while wearing a pelvic compression belt on walking and balancing abilities in adults after hemiplegic stroke

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〈Abstract〉

Purpose: To investigate the effects of wearing a pelvic compression belt during trunk stability exercise on balance and gait ability in hemiplegic stroke patients.

Methods: Thirty-six hemiplegic stroke patients participated and were randomly allocated to three groups: the paretic group (trunk stability exercise wearing a pelvic belt on paretic side), the non-paretic group (trunk stability exercise wearing a pelvic belt on non-paretic side), or the control group (trunk stability exercise without a pelvic belt). Walking and balancing abilities were assessed before and after trunk stabilization exercise.

Results: Significantly larger gains were identified in the paretic group than in the control group for all variables ($p<.017$). In addition, significantly larger gains were observed in the paretic group than in the non-paretic group ($p<.017$)(limit of stability, 15.6%; stance phase of paretic side, 4.1%; 10m walking test, -10.1%; 6 minutes walking test, 4.6%).

Conclusion: Wearing a pelvic belt on the paretic side during trunk stabilization exercise appears to be more effective at improving the walking and balancing abilities of hemiplegic stroke patients than wearing a pelvic compression belt on the non-paretic side or not wearing a pelvic belt.

Key Words: Trunk stability exercise, Pelvic compression belt, Gait ability, Balancing ability, Stroke

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관악기와 보컬트레이닝을 활용한 복합관악기교육프로그램이 심리사회적 스트레스가 높은 산업클러스터 대학생의 심리사회적 스트레스 및 호흡기능 그리고 삶의 질에 미치는 영향: 사전연구

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The Effects of the Combined Wind Instrument Training Program using Wind Instrument and Vocal Training on Psychosocial Stress, Breathing Function, and Quality of Life of University Students in Industrial Clusters with High Psychosocial Stress: A pliot test

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〈Abstract〉

Purpose: This study was conducted to investigate the effect of the complex wind instrument education program(CWEP) combined with wind instruments and vocal training on psychosocial stress, respiratory function and quality of life of university students in industrial clusters with high psychosocial stress.

Methods: This study divided 42 students in industrial clusters with high psychosocial stress into liberal arts program group(LAP, n=15), choral program group(CP, n=17), and CWEP group(n=12). The program was conducted twice a week for 12 weeks, 2 hours each. To measure the subject's Psychological stress, respiratory function and quality of life, we used the psychological well-being index(PWI-SF), WHO quality of life-BREF(WHOQOL-BREF), Pulmonary function test(PFT),and Respiratory muscle strength test(RMST).

Results: There was a significant difference in PWI-SF before and after the experiment in all groups(p<0.05). There was a significant difference before and after the experiment in the CWEP group and the CP group in the results of the PFT and RMST(p<0.05). In the PWI-SF, WHOQOL-BREF, PFT, and RMST, there was a significant difference in the CWEP group compared the other groups(p<0.05).

Conclusion: The CWEP is an effective program to reduce stress and improve respiratory function and quality of life for university students.

Key Words: Psychology, Stress, Industry, Instruments, Music therapy

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뇌졸중 편마비환자의 보행 훈련 유형 비교

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Comparison of Gait Training Types in Hemiplegic Stroke

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〈Abstract〉

Purpose: The purpose of this pilot study was to identify a walking training type that improves psychological and physical functioning in adult patients with chronic severe hemiplegic stroke.

Methods: A total of 22 patients with severe hemiplegic stroke in a rehabilitation hospital were randomly assigned to the underwater treadmill walking training or overground walking training. All participants performed 60 min of comprehensive rehabilitation therapy (5×/week for 12 weeks). Each group received underwater or overground walking training for 30 min (2×/week for 12 weeks). Psychological state, activities of daily living, and pulmonary and gait function were measured before and after the 12-week training.

Results: Both groups showed significant increases in SS-QOL, BDI, MBI, and MVV at post-training versus pre-training ($p < .05$). MVV changes post-training were significantly different between the two groups (+23.35 L *vs.* +4.76 L, $p < .05$). For the walking variables, step-time differential changes post-training showed significant differences between the groups (-.06 s *vs.* +.04 s, $p < .05$).

Conclusion: In severe stroke patients, underwater treadmill gait training can be more effective in improving gait and respiratory function than overground walking training.

Key Words: Stroke, Treadmill, Underwater, Walking

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뇌졸중 환자의 비마비측 팔다리를 이용한 몸통 운동이 균형 및 보행에 미치는 영향

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The Effects of Trunk Exercise with Less-affected Extremities on Gait and Balance in Stroke Patients

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〈Abstract〉

Purpose: This study investigated the effects of trunk exercise using less-affected extremities on gait and balance in stroke patients.

Methods: Thirty subjects with stroke disease were divided into two groups: a trunk exercise group that used less-affected extremities (n=8) and a general trunk exercise group (n=8). All interventions were conducted 30 min a day, 5 times per week, for 6 weeks. In addition, all subjects were evaluated using the Trunk Impairment. Scale, the Berg Balance Scale, and the Functional Gait Assessment before and after the intervention.

Results: Both groups showed improvements on all outcome measured pre- to post-intervention ($p<0.05$). The groups exhibited significant differences for TIS, BBS, FGA at post-intervention ($p<0.05$).

Conclusion: This study showed that trunk exercise using less-affected extremities has therapeutic benefits on gait and balance in individuals with stroke patients.

Key Words: less-affected extremities, Balance, Gait, Stroke

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닫힌 사슬에서 중둔근 강화 운동시 복부 드로잉 기법의 적용 유무가 중둔근의 근활성도에 미치는 영향

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The effect of the application of abdominal drawing technique on the muscle activity of the gluteus maximus muscle during exercise for strengthening the gluteus maximus muscle in a closed chain

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〈Abstract〉

Purpose: In this study, when the abdominal drawing technique, which is effective in maintaining the stability of the trunk, is applied simultaneously with the exercise of the middle cheekbones, we investigate the muscle activity of the torso and the middle cheekbones, and propose an effective exercise method for strengthening the muscle strength of the middle gluteus maximus.

Methods: TRA, GM, and QL muscle activity of the supporting side were measured according to the presence or absence of the abdominal-draw-in technique when pushing the wall with the opposite leg in the one-legged posture. A total of 5 seconds were measured, and the muscle activity values of 3 seconds excluding the first 1 second and the last 1 second were used, and the maximum isometric contraction (MVIC) was measured and quantified. The measurement was performed 3 times, and the values measured 3 times were averaged and used as the value of this study.

Results: As a result of confirming the lateral muscle activity supported by the presence or absence of the abdominal-draw-in technique when pushing the wall with the opposite leg in the one-legged posture, the TRA, GM, and QL muscle activation levels in the ADIM technique were all increased.

Conclusion: When pushing the wall with the opposite leg in a single foot support posture, applying the popular abdominal drawing method was effective in strengthening the gluteus maximus.However, it is difficult to generalize as an experiment with a small number of subjects and normal subjects. Therefore, in the future, we intend to extract a sufficient number of samples and conduct research.

Key Words: Gluteus medius

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둥근어깨 대상자에게 수정된 슈러그 운동(MSE)에 미치는 영향

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Effect of the Modified Shrug Exercise (MSE) on the participants with round shoulders

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〈Abstract〉

Purpose: The participants with round shoulders are characterized by an anterior dislocation and deorsumduction of the shoulder blades due to cervical lordosis and upper thoracic kyphosis. Therefore, we would like to apply MSE to compare the effect before and after arbitration of the target with round shoulders to see if this is an appropriate arbitration for round shoulder posture.

Methods: In this study, the average of 7 participants (male3, female4) for 3 times was calculated by measuring for 10 minutes after each set of MSE exercise, and the supine method for RSP measurement and analysis is a simple method of measuring RSP, described as the distance between the table floor and the acromion.

Results: Results of the study participants are as follows. The LT average height before MSE exercise was measured at 3.15 and the RT average height at 3.12, followed by the LT average height at 2.69 and the RT average height at 2.75, showing differences of －0.46 LT and －0.37 RT after MSE exercise.

Conclusion: This study has identified that the temporary MSE exercise will reduce the height of the backside of the acromion, so it is judged that it will be a good interventional exercise for participants with round shoulders if exercising steadily in the long term accordingly.

Key Words: Rounded Shoulder Posture, Shrug exercise

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로봇 보조 보행 훈련동안 족저압을 이용한 시각적 피드백이 만성뇌졸중 환자의 균형 능력에 미치는 영향

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The effect of visual feedback using plantar pressure during robot-assisted gait training on patients' balance ability

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〈Abstract〉

Purpose: This study aims to find out the effects of robot-assisted gait training that provides visual feedback using plantar pressure on balancing ability of patients with chronic stroke, and these results will be compared with those of robot assisted gating training without visual feedback. Based on these results, basic data will be suggested for therapeutic intervention for the improvement of balancing ability in patients with chronic stroke.

Methods: Out of the patients who was diagnosed with stroke and who has been in chronic stroke for 6 months, 30 subjects were randomly chosen and divided into two groups, 15 in the group of robot-assisted gait training with visual feedback and 15 in the group of robot-assisted gait training with non-visual feedback. The group of robot-assisted gait training with visual feedback was shown their current state of foot pressure distribution in color and shape on the monitor while training. The other group received general robot-assisted gait training. The intervention was conducted for 30 min/day, 3 days/week for 6 weeks, evaluation was conducted before and after the 6 weeks of training. A paired samples t-test was employed to compare the result within each of the group before and after therapeutic intervention and an independent sample t-test was used to compare the result between groups.

Results: The result showed statistically significant improvement in balance ability in both groups ($p<.05$). However, it showed no statistically significant difference in balance ability in Biodex Balance System ($p>.05$) even though there was a statistically significant difference in stand and walk test and Berg Balance Scale ($p<.05$).

Conclusion: These results show that robot-assisted gait training with visual feedback using plantar pressure have a positive effect on improving balance ability than the general robot-assisted gait training without visual feedback.

Key Words: Robot therapy, Plantar pressure, Visual feedback

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만성 뇌졸중 환자의 균형 및 보행 기능에 목, 체간 안정화 운동이 미치는 즉각적인 효과

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The Effects of Neck and Trunk Stability training on Gait and Balance in Chronic Stroke Patients

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〈Abstract〉

Purpose: This study investigated to identify the effects of neck stability training with trunk stability training on gait and balance function in patients with chronic stroke.

Methods: Twenty-two chronic stroke patients were included in this study. The experimental group subjects (n=11) received neck stability training (15min) with trunk stability training (15min), while the control group subjects (n=11) performed trunk stability training only for 30 min. Before and after intervention, the subjects underwent gait test and balance test.

Results: The cadence, gait velocity, and single support increased significantly in both groups after the intervention ($p<.05$). The changes in the gait variables were larger in the experimental group than the control group. The 95% confidence ellipse area, COP path length, and COP average velocity were significantly lower in both groups after the intervention ($p<.05$). The average stance force on the affected side was increased significantly in both groups ($p<.05$). The changes in the static balance variables were larger in the experimental group than the control group.

Conclusion: According to the results of this study, trunk stability training is a beneficial method, but a combination of neck stability training and trunk stability training is a more effective intervention to increase the balance and gait function in chronic stroke patients

Key Words: Chronic stroke, Balance, Gait, Neck stability training

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만성 뇌졸중 환자의 비마비측 발등굽힘근 근력강화 운동이 마비측 앞정강근 근활성도와 보행 및 균형 능력에 미치는 교차 훈련 효과

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Cross training effects of non-paralytic dorsiflexor strengthening exercise on paralytic tibialis anterior muscle activity and gait and balancing abilities in chronic stroke patients

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〈Abstract〉

Purpose: To investigate the effects of unaffected side dorsiflexor strengthening exercise on functional abilities in chronic hemiplegic patients after stroke.

Methods: A total of 21 chronic stroke patients underwent muscle strengthening exercise (MST) 5 times a week for 6 weeks (the experimental goup, MST to non-paralyzed dorsiflexion muscles, n = 11; the control group, MST to paralytic dorsiflexion muscles; n = 10). Paralytic tibialis anterior muscle activities (TAA), 10 m walking tests (10MWT) and timed up and go tests (TUG) were measured before and after intervention.

Results: A significant increase in TAA was observed after intervention in the experimental and control groups ($p < 0.05$) (experimental 212.1% for reference voluntary contraction (RVC), control 390.8% for RVC). TUG and 10MWT results showed significant reductions post-intervention in the experimental and control groups (experimental group -5.6 sec, control -4.8 sec; experimental group -3.1 sec, control, -3.9 sec; respectively). No significant intergroup difference was observed between changes in TAA or between changes in TUG and 10MWT results after intervention ($p > .05$).

Conclusion: Strengthening exercise performed on non-paralytic dorsiflexion muscles had positive cross-training effects on paralytic dorsiflexor muscle activities, balance abilities, and walking abilities in chronic hemiplegic stroke patients.

Key Words: cross-training, muscle activity, balance, walking, stroke

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만성뇌졸중 환자에게 복식호흡과 가슴우리확장 유도 호흡운동 복합 적용이 폐기능에 미치는 영향

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The effect of combined application of abdominal breathing and chest cage expansion-guided breathing exercise on lung function in chronic stroke patients

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〈Abstract〉

Purpose: This study was conducted to investigate the effect of combined application of abdominal breathing and chest cage expansion-guided breathing exercise on lung capacity in chronic stroke patients.

Methods: This study was conducted on 15 patients with chronic stroke. The subjects were those who had been diagnosed with a stroke 6 months later, and those who had no abnormalities in self-breathing were included. The subjects performed breathing exercises for 4 weeks each day for 10 minutes, and the change in lung capacity was measured. The breathing method was performed with 10 abdominal breathing and 10 thoracic expansion guided breaths as a set. It was performed for a total of 10 minutes, and if the patient was struggling in the middle, it was performed after a 1 minute break. The measurement equipment was pony fx. Forced vital capacity, Forced vital capacity in 1 second (FEV1) were measured. Statistical method is SPSS ver. 25 was used, and a paired t-test was used to find out the change according to the intervention effect.

Result: The FVC and 1FEV both showed statistically significant difference, and both variables showed significant increase.

Conclusion: Through this study, it can be seen that in patients with chronic stroke, the combined breathing exercise of abdominal breathing and chest cage expansion exercise has an effect on lung function.

Key Words: Chest expansion-induced breathing exercise, Chronic stroke, FEV1, FVC

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모션테이핑이 엉덩이 관절 능동관절운동범위에 미치는 영향

조용호 · 황윤태[1†]

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Effect of motion taping on the active range of motion of the hip joint

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〈Abstract〉

Purpose: The purpose of this study was to investigate the change in the active range of motion(AROM) of the hip joint when applying Motion taping to adult males.

Methods: The subjects of this study were 20 adult males, and those with an AROM in the hip flexion of more than 70 degrees and less than 90 degrees. Although not a patient complaining of pain or function within the AROM, the effect of taping was measured because the AROM was limited.

The subjects were adults with no pain or discomfort in life. It was applied to the subjects through the motion taping method. Using a treatment table, the hips were in an open position and the knees in a bent position, and the iliopsoas and quadriceps femoris were relaxed, and the tape was attached without stretching. AROM measurement used a goniometer. Measurements were taken when taping was not applied, when applied to the iliopsoas muscles for the hip joint, and when applied to the iliopsoas and biceps femoris. As for the application method, three conditions were randomly applied, and the AROM was measured. To compare the AROM, repeated measurement variance analysis was performed, and the statistical significance level was set to 0.05.

Result: As a result of this study, the AROM of the hip joint was significantly increased when taping was applied.

Conclusion: The application of motion taping can be said to be effective in increasing the AROM of the hip joint.

Key Words: AROM, Iliopsoas, Male, Motion taping, Quadriceps femoris

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물리치료사의 업무 만족도에 대한 상관관계

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Correlation Analysis in the Job Satisfaction of Physical Therapist

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〈Abstract〉

Purpose: This study investigated to find the level of satisfaction of physical therapists. Through this, we intend to provide data on ways to improve the job satisfaction of physical therapist.

Methods: The subjects of this study were 284 physical therapists working as physical therapists with more than 6 months of experience. Data collection was conducted in a self-report questionnaire. The questionnaire consisted of 7 questions including job satisfaction, gender, age, education, clinical experience, workplace, and annual salary. In order to assure the statistical significance of the results, we used for IBM SPSS 21.0 program, the statistical significance was set to $p<.05$, and descriptive statistics and pearson correlation analysis were performed.

Results: The results of this study were as follows : 1) A correlation analysis was conducted to find out the correlation with the job satisfaction of physical therapists. Job satisfaction is gender($r=.125$, $p<.05$), education ($r=-.274$, $p<.01$), annual salary ($r=-.240$, $p<.01$), clinical experience ($r=-.120$), workplace ($r=.144$, $p<.01$). there was. Therefore, it was found that the higher the age of the female than the male, the lower their education, the lower their annual salary and clinical experience, the higher their satisfaction. Also, it was found that the satisfaction level was high when the workplace was at big hospital.

Conclusion: According the results of this study, Physical therapists working in university hospitals and general hospitals as well as female physical therapists with low experience seem to have high level job satisfaction.

Key Words: Job satisfaction, Physical therapist, Workplace

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발란스 테이핑이 제한된 몸통 회전에 미치는 즉각적인 효과: 사례 연구

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The Immediate Effect of Balance Taping on Limited Trunk Rotation: A Case Study

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〈Abstract〉

Purpose: The aim of this case study was to evaluate the immediate effect of balance taping with kinesiology tape in subject with limited trunk rotation.

Methods: Balance taping with kinesiology tape with approximately 10% stretch was applied to the left internal oblique and right external oblique muscles of subjects with a limited range of motion (ROM) of trunk left rotation.

Results: After balance taping with kinesiology tape to the left internal oblique and right external oblique muscles, the ROM of trunk left rotation increased from 15° to 40° and that of trunk right rotation increased from 38° to 40°.

Conclusion: Balance taping with kinesiology tape may increase the limited ROM of trunk rotation. Further studies on the effects of balance taping on limited trunk rotation are needed.

Key Words: Trunk Rotation, Balance Taping, Kinesiology Tape

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발목 보호대의 종류에 따른 족저압의 차이

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Differences in Foot Pressure depending on the Type of Ankle Protector

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〈Abstract〉

Purpose: When ankle instability occurs due to an ankle sprain, an ankle protector is worn. Ankle protectors of various designs and materials are produced and sold. The purpose of this study was to investigate the difference in foot pressure during walking according to the type of ankle protector used during ankle instability

Methods: The subjects of this study were 15 healthy adults(7 males, 8 females, average age 21.5 years). All subjects were measured to see their foot pressure by F-scan system, classifying it into three groups: without ankle protector group, short ankle protector group, and long ankle protector group.

After wearing the ankle protector, the foot pressure was measured after walking naturally about 5m. All subjects wore comfortable pants and ankle restraints over their bare feet. The foot pressure measurement area consists of 6 forefoot areas(big toe area, 3rd-4th toe area, little toe area, lateral metatarsal area, middle metatarsal area, medial metatarsal area), and rear foot was divided into 4 areas(lateral heel area, medial heel area, lateral ankle area, and medial ankle area). In order to assure the statistical significance of the results, we used for SPSS 21.0 for windows.

Results: The results of this study were as follows : 1) There were no statistical significance according to the type of ankle brace in 6 areas of forefoot pressure. 2) In the rear foot pressure area, the lateral heel area, medial heel area, and lateral ankle area did not showed statistical significance, and the medial ankle area showed statistical significance according to the type of ankle protector($F=3.959$, $p<.05$), post-hoc analysis revealed that there we a difference between the group without ankle protector and the group with long ankle protector.

Conclusion: According the results of this study, there were difference in foot pressure in the foot arch area in the type of ankle protector, it would be necessary to select an ankle protector according to the characteristics of the subject's ankle.

Key Words: Ankle instability, Foot pressure, Ankle protector

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방아쇠수지가 손목터널증후군 환자의 악력, 통증 및 상지기능에 미치는 영향

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Effect of trigger finger on pain, grip strength and function of upper limb of patients with carpal tunnel syndrome

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〈Abstract〉

Purpose: The purpose of this study was to investigate the efficts of trigger finger on pain, muscle strength and function in carpal tunnel syndrome(CTS) patients.

Methods: A total of 60 subjects(30 CTS with trigger finger and 30 CTS without trigger finger) were assessment for pain(NPRS), muscle strength(power grip, key pinch , tip to tip pinch, three jaw pinch) and function(DASH). The effect sizes of the two groups were compared, and the correlation between the trigger finger and each variable was analyzed.

Results: The results showed that there were significantly difference in the pain, muscle strength excluding three jaw pinch and function($p<.05$). The results also showed correlation between trigger finger and pain($r=.552$), muscle strength excluding three jaw pinch((PG $r=-.296$, KP $r=-.260$, TTP $r=-.285$), and function($r=.375$). The function of CTS patients was related to pain($r=.550$) and power grips($r=-.324$) of muscle strength.

Conclusion: In CTS patients with triggers compared to CTS, muscle weakness, pain increase, and function reduction were shown. In addition, triggers are correlated with muscle strength, pain and function, and muscle weakness and increased pain affect the daily living of CTS patients with tiggers. Therefore, physical therapy interventions of CTS patients with triggers should be combined with treatment for muscle strength enhancement as well as pain reduction.

Key Words: CTS, Trigger finger, Grip strength, Pain, Function of upper limb

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복부-드로잉 기법 유무에 따른 런지 운동 시 몸통과 다리의 근활성도에 미치는 영향

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The effect of the abdominal drawing maneuver on the muscle activity of the trunk and legs during lunge exercise

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〈Abstract〉

Purpose: The purpose of this study was to investigate the change in muscle activity of the trunk and legs during lunge exercise according to the presence or absence of abdominal drawing maneuver.

Methods: This study conducted the experiment after sufficiently practicing the abdominal drawing maneuver for 20 minutes using a pressure biofeedback unit before the experiment. The experimental procedure was performed according to the sequence procedure, and the order of lunge exercise was determined according to the presence or absence of the abdominal drawing maneuver through randomized comparison. In the starting position of the lunge exercise, the dominant leg was protruded forward so that the distance from the non-dominant leg was increased by 70-100cm, and the heel of the non-dominant leg was raised. As for the method of measuring muscle activity the dominant side transvers abdominis muscle (TRA), erector spinae muscle (ES), vastus medialis oblique muscle (VMO), vastus lateralis oblique muscle (VLO), tibialis anterior(TA), and lateral gastrocnemius (LGCM) were measured through surface EMG (TM DTS, Noraxon, USA). during lunge exercise according to the presence or absence of the abdominal drawing maneuver. A total of 3 measurements were repeated, and the values measured 3 times were averaged and used.

Results: As a result of this study, the muscle activity of TRA, VOM, VLO, TA, and GCM increased and the muscle activity of ES decreased than that of the lunge exercise with abdominal drawing maneuver.

Conclusion: This Maintaining the abdominal drawing maneuver and performing lunge exercise increased the stability of the trunk, reducing overuse of the lower back, and at the same time increasing the muscle strength of the legs. Therefore, it is recommended to maintain and practice the abdominal drawing maneuver during lunge exercise.

Key Words: Abdominal Drawing-in Maneuver, Biofeedback Unit, Lunge Exercise, Muscle Activity

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비특이적 요통환자에게 Stabilizer of pressure biofeedback을 이용한 호흡운동이 통증, 근활성도에 미치는 영향

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Effects of breathing exercise using stabilizer of pressure biofeedback on pain and muscle activity in nonspecific low back pain patients

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〈Abstract〉

Purpose: In this study, it was conducted to investigate the effects of breathing exercises when using a stabilizer of biofeedback device when performing breathing exercises for patients with low back pain.

Methods: The subjects of this study were 24 patients with low back pain, and this study was conducted to investigate the effect of respiratory exercise using stabilizer of biofeedback. The subjects were subjects with low back pain and patients with VAS 4 or higher. The experimental group and the control group were randomly divided into 12 meals. Physical therapy was performed for pain management in both the experimental group and the control group. Heat therapy 15 minutes and electrotherapy 15 minutes were performed. In the case of the experimental group, a stabilizer of biofeedback device was used when performing breathing exercises. The patient performed breathing exercises with a stabilizer of biofeedback placed in the lumbar region below the waist in a supine position. Subjects performed breathing exercises while maintaining a constant pressure through a stabilizer of biofeedback device to train the trunk muscles through breathing exercises. It was conducted for a total of 4 weeks, and 30 minutes of physical therapy and 10 minutes of breathing exercise were performed three times a week. When performing the breathing exercise for 10 minutes, 1 set of exhalation and inhalation was performed based on 10 times, followed by a breathing exercise after rest for 10 seconds. The breathing rate was measured by the subjects at a comfortable depth, and the total number of times was not measured due to the different rates of the subjects, but the total time was measured. Measurements were taken to measure the size of pain and muscle activity of the vertebral erector muscles. VAS was used for the size of pain, and muscle activity was measured using an EMG device. The measurement posture was measured by attaching it to the outside of lumbar vertebrae 2 at 2 cm. Muscle activity was measured at the maximum torso extension motion based on the maximum isometric contraction.

Result: As a result of this study, changes in pain and muscle activity were found to be significant in both the control and experimental groups.

Conclusion: As a result of this study, it was shown that breathing exercise using stabilizer of biofeedback is effective for pain reduction and muscle activity.

Key Words: Breathing exercise, Muscle activity, Nonspecific LBP, Stabilizer of pressure biofeedback

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수정된 가쪽 목말밑 비탄력 테이핑이 뇌졸중 환자의 보행과 안정성 한계에 미치는 영향: 예비 실험연구

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Effect of Modified Lateral Subtalar Non-elastic Taping on the Gait and Limit of Stability on Stroke Patients: A Preliminary Experimental Research

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〈Abstract〉

Purpose: This study aimed to learn the immediate effect from the application of a modified lateral subtalar non-elastic taping on stroke patients. Cadence, velocity, step, and stride were measured as regards the gait cycle. Paretic side, non-paretic side, front side, back side, and total were measured as regards limited of stability.

Methods: The experiment was conducted on 7 adult stroke patients exhibiting symptom of foot drop, and the subjects participated in the experiment after filling out an informed consent form (ICF). The subjects participated in all 3 types of experiments (non-taping, placebo taping and non-elastic taping), and the experiment sequence was determined by drawing lots. Gait cycle measured by Gaitrite and limited of stability measured by Biorescue. The collected data was analyzed using the SPSS 18.0 program. Repeated ANOVA was used for data comparison between non-taping, placebo taping, and non-elastic taping methods. The statistical significance level (α) was. 05.

Results: Regarding the gait cycle, a statistically significant difference was observed as the average values of cadence, velocity, step, and stride were higher for placebo taping compared to those measured under non-taping ($p<.05$). Also, a statistically significant difference was observed as the average values of cadence, velocity, step, and stride were higher for non-elastic taping compared to those measured under placebo taping ($p<.05$). As regards the limited of stability, a statistically significant difference was observed as the average values of non-paretic side, front, and total were higher for placebo taping compared to those measured under non-taping ($p<.05$). Also, a statistically significant difference was observed as the average values of paretic side, non-paretic side, front, back, and total were higher for non-elastic taping compared to those measured under placebo taping ($p<.05$).

Conclusion: From this study, it can be concluded that the application of modified lateral subtalar non-elastic taping on stroke patients seems to be an efficient method to immediately improve the gait cycle and limited of stability.

Key Words: Ankle, Bracing, Dorsi flexion, Eversion, Cadence, Velocity, Step, Stride, Balance

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스쿼트 운동 중 발목관절의 위치에 따른 다리와 척추근육의 활성화 비교

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Comparison of Muscle Activities of Lower Extremity and Erector Spinae Muscles According to Ankle Joint Position during Squat Exercise

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〈Abstract〉

Purpose: The purpose of this study was to investigate the most effective ankle joint position for squat exercise by comparing muscle activities of lower extremity and erector spinae muscles in different ankle joint positions.

Methods: Thirty-seven normal healthy adults in their 20's participated in this study. Muscle activities of dominant vastus medialis oblique, vastus lateralis, biceps femoris, and erect spinae were measured in three ankle joint positions; dorsiflexion, neutral, and plantar flexion.

Results: Muscle activities of the vastus medialis oblique, vastus lateralis, and erector spinae muscles were statistically different in the three ankle joint positions during squat exercise ($p < .05$). Vastus medialis oblique muscles showed higher muscle activities in ankle plantar flexion than in the neutral position (79.2% of maximal voluntary isometric contraction (MVIC) *vs*. 75.8% of MVIC). Vastus lateralis muscles showed higher muscle activity in the neutral position than in dorsiflexion (71.8% of MVIC *vs*. 64.7% of MVIC), and erector spinae muscles showed higher muscle activity in dorsiflexion than in plantar flexion or in the neutral position (28.9% of MVIC *vs*. 21.8% of MVIC or 24.5% of MVIC, respectively).

Conclusion: In squat exercises designed to strengthen the vastus medialis oblique, ankle joint plantar flexion is probably the most effective ankle training position, and the dorsiflexion position might be the most effective exercise for strengthening the erector spinae muscle.

Key Words: Squatting exercise; Muscle activity, Ankle joint position, Multi-joint position

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아급성기 뇌졸중 재활을 위한 거울치료

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Mirror Therapy for Subacute Stroke Rehabilitation

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〈Abstract〉

Purpose: The purpose of this study was to identify whether mirror therapy could improve balance, gait in the subacute stroke patients.

Method: Thirty three patients with subacute stroke were randomly divided into three groups: experimental group 1 (n=11), experimental group 2(n=11), and control group (n=11). The subjects in experimental group 1 performed mirror therapy by the unaffected side lower extremities and the subjects in experimental group 2 underwent same therapeutic exercise used in mirror therapy by the affected side lower extremities, five times a week for four weeks and 30 minutes per session. In addition, the subjects of three groups were provided conventional physical and occupational therapy, five times a week for four weeks and two hours per session. BBS (Berg Balance Scale), POMA (Performance Oriented Mobility Assessment), 10MWT (10m Walk Test) were used to evaluate the balance, quality of gait and gait speed before and after intervention. Within-group comparison and between-groups comparison were analyzed using the Wilcoxon sign-rank test and the Kruskal Wallis H test, and post-hoc pairwise comparisons analyzed using the Mann-Whitney U test.

Results: In within-group comparison of BBS scores, all the three groups showed significant improvements after intervention ($p<.01$). In between-group comparison, there was no significant difference in the change of BBS scores before and after intervention ($p>.05$). In within-group comparisons of POMA scores, all three groups showed significant improvements after intervention ($p<.05$). In between-groups comparison, there was no significant difference in the change of POMA scores before and after intervention ($p>.05$). Gait speed (10MWT) increased significantly in experimental group 1 and 2 after intervention ($p<.01$). In the change of gait speed before and after the intervention, experimental group 1 was significantly greater than that of the control group ($p<.05$).

Conclusion: This study suggests that mirror therapy would be effective intervention to improve gait speed in subacute stroke patients. Further studies with a larger sample size are needed to support the findings of this study.

Key Words: Mirror Therapy, Balance, Gait, Subacute Stroke

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엘리트 운동선수에게 마사지 건 적용시 근 긴장도의 영향

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The Effects of Muscle Tension on the Application of Massage Guns to Elite Athletes

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〈Abstract〉

Purpose: The purpose of this study is to quickly relieve muscle fatigue for elite athletes with high levels of exercise and high muscle tension. Therefore, we will investigate how massage guns can reduce muscle fatigue and tension.

Methods: Stretching was performed as usual immediately after the game, and the condition was adjusted as usual immediately after the regular game. After lying on the massage bed in the treatment room immediately after the exercise, I stood on the Myoton Pro device in a lying position, and after 15 minutes of massaging was performed immediately after my thigh using Theragun, I measured it again with the Myoton Pro device.

Results: On average, 15 minutes of application to elite athletes with terragon is significant when applied to the statistical program as a result.

Conclusion: The results were statistically significant on the basis of a significant level of 0.01 with t=3.771, p=0.005. Therefore, the rejection of the null hypothesis and the alternative hypothesis are adopted, so there is a difference between the application of the massage gun before the application of the muscle massager by elite athletes.

Key Words: Elite Athletes, Massage Guns, Muscle Tension

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요가 호흡이 성인 남성의 호흡 기능에 미치는 영향

공응경†

한국 몸챙김 연구소

Effect of Yoga Breathing on Respiratory Function in Male Young Adults

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Korea Bodyfulness Center

〈Abstract〉

Purpose: The purpose of this study is to investigate the effect of yoga breathing on respiratory function.
The subjects of this study were 15 male adults.

Methods: The subjects were subjects who had no diseases or problems related to breathing, and subjects who had no experience in training on breathing exercises. In this study, a breathing method using the entire abdomen was applied as a yoga breathing method. Subjects performed breathing exercises in a sitting position by applying breathing as if naturally inflating the abdomen and exhaling. Yoga breathing was performed 3 times per week, and breathing exercises were performed for 10 minutes each time. The total duration of intervention was 4 weeks. As a measuring tool, inspiratory muscle strength and exhalation muscle strength were measured using MicroRPM. Subjects measured the maximum inhalation pressure and maximum exhalation pressure in a sitting position using a MicroRPM. Before the measurement, the subject was given sufficient demonstrations and explanations, such as how to bite the mouthpiece, how to inhale as much as possible, and how to exhale as much as possible, and then confirm that the subject understands and has the ability to perform and measure. When measuring the maximum inhalation pressure and the maximum exhalation pressure, the subject was kept for at least 1 second and then recorded. At least 30 seconds between experiments, the maximum inhalation effort and maximum exhalation effort were made three times. Verbal encouragement was given throughout the process to achieve maximum results. It was recorded using the average value of 3 measurements. For the pre-post comparison, the corresponding sample t-test was used, and the statistical significance level was set to 0.05.

Results: As a result of the study, inspiratory muscle strength and inspiratory muscle strength were significantly increased after intervention. There was a statistically significant difference in the correlation of values after intervention.

Conclusion: As a result of this study, yoga breathing has a positive effect on the improvement of the respiratory function(muscle strength).

Key Words: Male young adults, Respiratory function, Yoga Breathing

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요추전만을 증가시킨 백팩 착용이 배근육과 다리근육의 근활성화에 미치는 영향

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The effects of wearing a backpack with increased lumbar lodorsis on the muscle activation of the abdominal and leg muscles

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〈Abstract〉

Purpose: Wearing a backpack can negatively affect the balance of spinal alignment by reducing curve of the lumbar spine. This study investigated to find the effects of backpacks that can recover the decrease in lumbar lodorsis on the muscle activity of the trunk and leg.

Methods: A total of 15 adult volunteers who mainly wear backpack participated in the study. The study was conducted when walking on the subjects without carrying a backpack, with carrying a general backpack, and backpack that can increased lumbar lodorsis. We investigated muscle activity of the abdominal oblique externus of the trunk and the gastrocnemius medial side of the leg under these three conditions. In order to asure the statistical significance of the results, we used for SPSS 23.0 for windows.

Results: Muscle activity of abdominal oblique externus showed a significant increase in the states of wearing a general backpack and backpack with increased lumbar lodorsis compared to the case without a backpack, and there was no significant difference between the general backpack and backpack with increased lumbar lodorsis.

Conclusion: The results of this study indicate that wearing a backpack contribute to increase muscle activity of abdominal oblique externus. In the future, multidirectional studies will be needed on the effects of backpack shape on spinal balance.

Key Words: Backpack, Lumbar lodorsis, Muscle activity, Abdominal oblique externus

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인지감퇴 노인에서 보행속도와 COP 속도의 상관성 연구: 선행연구

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The Correlation between Gait Speed and Velocity of Center of Pressure Progression in the Older Adults with Cognitive Decline: A Pilot Study

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〈Abstract〉

Purpose: The purpose of this study was to identify the correlation between gait speed and COP velocity of gait cycles in healthy older adults as well as older adults with cognitive decline.

Methods: The subjects of this study were 40 older adults who are aged 65 or older (20 in the normal group, 20 in the cognitive decline group), all of whom agreed to participate in the study. The gait speed was measured using a 4-Meter Walking Test on a 6m walking path. The time required to walk on the 4m distance excepts the first and last 1m corresponding to the acceleration period and deceleration period (seconds) was measured. Tekscan®F-Scan was used to measure foot pressure. COP coordinates were calculated using software of F-Scan. In order to assure the statistical significance of the results, we used for SPSS 18.0 for windows.

Results: Gait speed was associated with the COP progression velocity in mid stance ($r = .719$, $p < .05$), cadence ($r = .719$, $p < .05$) and the COP progression velocity in loading response velocity ($r = .515$, $p < .05$) in old adults with cognitive decline.

Conclusion: According the results of this study, the COP progression velocity is an important factor for predicting gait speed in old adults with cognitive decline, suggesting that the cognitive function has an effect on gait speed and the velocity of COP progression.

Key Words: gait, pressure, cognitive decline

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인지적 과제가 65세 이상 노인의 보행에 미치는 영향

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The effect of cognitive task in gait above 65 years old

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〈Abstract〉

Purpose: As the rate of seniors increases, the number of their fallouts is also increasing. Most previous studies suggest that the causes of fallout are multitasking disturbing attention in gait control while walking as well as muscle weakness by ageing and decline of balance ability. To demonstrate these correlations between multitasking with walking and fallouts, many studies analyse changes in gait with cognitive tasks considered as being more complicated than counting backwards. According to this background, we aim to identify whether counting backwards affects gait significantly in healthy elderly adults.

Methods: Thirty-five healthy elderly people were recruited who are above 65 years older. They asked to walk a four-meter pathway with usual walking in two conditions that were single task and dual task. Dual task was consisted with counting backwards. Gait velocity and changes of plantar pressure were measured with F-scan foot insole. It is analysed by using Tekscan® F-Scan® version 7 Research software.

Results: In dual task, gait velocity, cadence were decreased compared with single task. While, total gait duration(gait cycle, stance phase, swing phase) was increased in dual task condition. And also, there were significant difference between single task and dual task in gait cyle(right foot), stance phase(right foot), swing phase(right foot). only measurements on the right side were evaluated that they have a significant difference between task conditions($p<0.05$). However, all of the plantar pressure measurements including COP deviation, peak pressure didn't change significantly between the task conditions($p>0.05$).

Conclusion: This study suggests that cognitive task such as counting backwards while walking can affect gait in 65 years old. By distinguishing and quantifying the characteristics of the gait through foot-insole measurement, this paper can be used as a reference to further analyse the effects of cognitive tasks being considered as more complicated than counting backwards.

Key Words: Gait, COP deviation, cognition

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전방머리자세를 가진 성인의 근 긴장도, 목 장애지수 및 목 정렬 간의 상관관계

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The Relationship Between Muscle Tone and Neck Disability Index, Craniovertebral Angle in Adult with Forward Head Posture

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〈Abstract〉

Purpose: This study investigated to identify the relationship between muscle tone and neck disability index, craniovertebral angle in adult with forward head posture.

Methods: This study is cross sectional design. Twenty subject with forward head posture were included in this study. Before the start of the study, all subjects understood its content and signed an informed consent form. The subject participated in muscle tone, neck disability index, and craniovertebral angle tests. all tests were performed in a single day.

Results: There were significant negative correlations between CVA and other variables(NDI, SCM muscle tone, SCM muscle stiffness, UT muscle tone and UT muscle stiffness)($p < .05$). There were significant positive correlations between NDI and muscle tone(SCM muscle tone, SCM muscle stiffness, UT muscle tone and UT muscle stiffness)($p < .05$).

Conclusion: This study concludes that there were significant correlations between CVA and SCM muscle tone, UT muscle tone, Also there were significant correlations between NDI and SCM muscle tone, UT muscle tone.

Key Words: Forward head posture, Neck disability Index, Muscle tone

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크로스 테이핑이 제한된 2번째 손가락 굽힘에 미치는 즉각적인 효과: 사례 연구

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Immediate Effect of Cross Taping on Limited Flexion of the Second Finger: A Case Study

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〈Abstract〉

Purpose: The purpose of this study was to evaluate the immediate effect of cross taping in subjects with limited flexion of the left second finger.

Methods: Cross taping was applied to the metacarpal, proximal, and middle phalanges (bones) of the left second finger of subjects with limited flexion of the left second finger.

Results: After cross taping to the metacarpal, proximal, and middle phalanges (bones) of the left second finger, the flexion of the proximal interphalageal joint of the left second finger increased from 76° to 85° and that of the distal interphalangeal joint of the left second finger increased from 57° to 69°.

Conclusion: Cross taping may increase the limited flexion of the left second finger. Further studies are needed on the effects of cross taping on limited flexion of the fingers.

Key Words: Finger, Cross Taping, Interphalageal Joint

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키네시오 테이핑과 둥근 어깨 자세 교정기구가 둥근 어깨 자세에 미치는 영향

고두현 · 고승겸 · 문지영 · 오세린 · 이미르 · 이준원 · 임승희 · 조단비 · 권혁규†

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The Effects of Using Kinesio Taping or Orthosis for Rounded Shoulder Posture on Correction of Rounded Shoulder Posture

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〈Abstract〉

Purpose: Rounded shoulder posture causes protraction, downward rotation, and anterior tilt of the scapula. Many studies have reported that various interventions for rounded shoulder porsture syndrome including manual therapy, exercise (posture correction, stretching, muscle strengthening), and taping could help to correct the rounded shoulder posture. However no study on the effect of orthosis for roundedd shoulder posture has been reported yet. Therefore, we investigated the effect of orthosis for rounded shoulder posture with exercise in 32 subjects with rounded shoulder posture.

Methods: Thirty-two participants were randomly assigned into the kinesio tape group (n=15), and the orthosis group (n=17). Six exercise were performed three times per a week for pectoralis minor and four strengthening exercises for adduction of scapula, long sitting row, posterior V-raise and Y-to-I exercise. Before and after the exercise, height of the acromion to the ground, length between the root of spine of scapular and the spinous process of vertebrae, forward head angle, forward shoulder angle, Visual Analog Scale (VAS), and Neck Disability Index (NDI) were measured.

Results: Both groups showed significant differences in height of the acriomion to the ground, length between the root of spine of scapular and the spinous process of vertebrae, forward head angle, forward shoulder angle, VAS, and NDI within each group, respectively. However, no significant differences in all measurements were observed between two groups.

Conclusion: We demonstrated that the orthosis for rounded shoulder posture with exercise would improve the correction of the rounded posture as much as the effect of kinesio tape.

Key Words: Orthosis, Kinesio taping, Rounded shoulder posture

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키네시오라지 테이프를 이용한 발란스 테이핑이 반가르트 병변에 미치는 즉각적인 효과: 사례 연구

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The Immediate Effect of Balance Taping with Kinesiology Tape on Bankart Leisons: A Case Study

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〈Abstract〉

Purpose: The purpose of this case study was to investigate the immediate effect of balance taping with kinesiology tape in patient with shoulder pain and limited range of motion due to Bankart lesions.

Methods: Patients with Bankart lesions who had limited range of motion in the right shoulder, changes in joint motion range, and pain were evaluated before and after applying balance taping two times on the shoulder and forearm muscles.

Results: After balance taping, shoulder pain decreased from visual analog scale score 3 to 1 and shoulder flexion increased from 125° to 158°.

Conclusion: Balance taping for shoulder pain and limited shoulder flexion due to Bankart lesions may help reduce pain and increase the shoulder range of motion. However, further scientific studies are needed on the effect of balance taping on limited range of motion of the shoulder joint and pain due to Bankart lesions.

Key Words: Bankart Leisons, Balance Taping, Kinesiology Tape

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한 다리 스쿼트 동작 시 시각차단유무가 하지 근활성도에 미치는 영향: 예비 실험연구

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Effect of Visual Blocking on Lower Limb Muscle Activity During One Leg Squat Movement: A Preliminary Experimental Study

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〈Abstract〉

Purpose: The purpose of this study is to find out the difference in leg muscle activity of normal people when one leg squat exercise is performed in a state where vision is blocked and unblocked on a stable surface, and to present an effective exercise method for strengthening muscle strength.

Methods: In 2020, five male students in their 20s who were enrolled in D University in Busan were selected, and the study was conducted with those who voluntarily agreed to participate in the study. One leg squat motion was performed with the experimenter's dominant leg and repeated measurements were made three times. The knee angle was set to a 60° flexion posture, which obtained a significant increase in selective strengthening of the medial biceps through many studies. One leg squat was performed for 5 seconds, and the EMG values measured for 3 seconds excluding the first 1 second and the last 1 second were used.

Results: VMO 402.57 VLO 402.57 TA 793.43 When doing leg squat with eyes closed VMO 327.18 VLO 377.22 TA 571.06 when doing leg squat with eyes open showed a difference between the two exercises.

Conclusion: Closed eyes squat exercise is thought to be one of the exercise methods that can improve muscle activity.

Key Words: Squat Muscle Activation, Visual

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허리벨트의 신장성이 비특이성 요통환자의 앉은 자세에서 일어서기 동작 시 생체역학에 미치는 영향

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The effect of extensibility of the lumbar belt on biomechanics during sit-to-stand motion in non-specific low back pain patients

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〈Abstract〉

Purpose: This study is to investigate the biomechanical factors of wearing lumbar belts with different extensibility to low back pain patients and office workers with back pain to whom sit-to-stand is an important functional activity.

Methods: The experiment conducted with total 30 subjects; 15 non-specific low back pain patients as an experimental group, and 15 healthy adults as a control group. The participants performed sit-to-stand motions in a seated position under three conditions in a random order: without the lumbar belt(Condition 1), with a non-extensible lumbar belt(Condition 2), and with extensible lumbar belt(Condition 3). The kinematics, kinetics, and muscle activity variables of standing motion were measured at each sitting position under each condition using three-dimensional motion analysis instruments, force plates and surface electromyography instrument. In order to confirm the interaction between the presence or absence of low back pain and the change in the condition of wearing the lumbar belt, an analysis of two-way repeated ANOVA was performed.

Results: There was an interaction between the groups and the wearing of lumbar belts. The use of lumbar belts reduced the required time for the non-specific low back pain patients for movements, increased the pelvic angle of healthy adult group, and decreased the range of motion of trunk in both groups. In the non-specific low back pain patient group, the flexion-phase muscle activity of the vastus lateralis and biceps femoris decreased whereas the healthy adult group increased.

Conclusion: Both extensibility lumbar belts had a beneficial effect on the biomechanical side by reducing the range of motion of trunk in both non-specific low back pain patients and healthy adults, and had a positive effect on the motor control of the non-specific low back pain patients.

Key Words: low back pain, Lumbar belt, Sit-to-stand

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허리안정화 운동이 여성노인의 등속성 근력과 보행 변수에 미치는 영향

방현수†

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The Effects of Lumbar Stabilization Exercise on Isokinetic Muscle Strength and Gait Variables in Elderly Women

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〈Abstract〉

Purpose: The purpose in this study was to identify the effects of isokinetic muscle strength and gait variables in the elderly women by lumbar stabilization exercise during 6 weeks.

Methods: The twenty elderly women over 65 ages involved volunteerly in this study. All of them were healthy status that have no problem to orthopedic condition. Twenty elderly women were divided into 10 lumbar stabilization group(LEG) and 10 general exercise group(GEG). In both groups, isokinetic muscle strength(Biodex) and gait variables(gait analysis) device was measured over 4 and 8 weeks.

Results: At isokenetic muscle strength, LEG was significantly increased in Before, 4 weeks and 8 weeks according to the period, but there was no significant difference in GEG in all periods. At gait variables, there was no significant difference in LEG between before-4 weeks and 4-8 weeks, but there was a significant increase in Before-8weeks. There was no significant difference in all periods of GEG group. There was no significant difference in the amount of change between the two groups.

Conclusion: In this study, it was found that the lumbar stabilization exercise was effective in improving the isokinetic muscle strength and gait variables in the elderly women. If the elderly women continues to lumbar stabilization exercise, it is also an effective method for isokinetic muscle strength and gait variables. Future studies are expected to study individual isokinetic muscle measurements after lumbar stabilization exercise.

Key Words: Lumbar stabilization exercise, Isokinetic muscle strength, Gait variables

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