www.kspm.or.kr

kspm 2018 Autumn Conference
2018 대한물리의학회 추계학술대회 및 정기총회

심폐 물리치료에 대한 국제적 최신 동향에 대한 접근과 이해

일시 | 2018. 9. 15(토) 오후 13시~17시30분

장소 | 호남대학교 성인관 1층 국제회의실

대한물리의학회
Korean Society of Physical Medicine

제 16회 대한물리의학회 추계학술대회 및 정기총회 일정 및 세부사항

심폐 물리치료에 대한 국제적 최신 동향에 대한 접근과 이해

○ **일 시 : 2018년 9월 15일(토요일) 13:00~17:30**

○ **장 소 : 호남대학교 성인관 1층 국제회의실**

○ **일정표**

시 간	프 로 그 램	비 고
12:30~13:00	참가자 등록	재무이사
13:00~13:10	개회식	학회장
	session 1. 논문 발표	좌장 : 이현민 (호남대학교 물리치료학과)
13:10~14:00	Deducting solutions to problems at the industrial site through deepening curriculum (A study on the improvement of musculoskeletal diseases of physical therapist)	대구한의대학교 권교임
	Immediate effects of ankle eversion taping on gait ability of chronic stroke patients	대구대학교 신영준
14:00~14:10	휴식시간	
	session 2. 특강	학술이사
14:10~16:00	특강 1 Current perspective of pulmonary and cardiac rehabilitation in Sydney, Australia	한윤아 – Pulmonary rehabilitation coordinator – Senior physiotherapists in pulmonary and chronic disease department of physiotherapist Canterbury hospital Sydney local health district Canterbury road
	특강 2 ICF 개념에 의한 진단	배성수 (대구대학교 명예교수)
16:00~16:20	휴식시간	
	session 3. 물리치료 연구를 위한 기초	학술이사
16:20~17:00	연구윤리 관련 특강 IRB와 연구윤리	박소현 (영산대학교 물리치료학과)
17:00~17:30	정기총회 및 폐회식	사회자, 회장 진행

Contents

6. 초록_일반 session

개회사

안녕하십니까. 존경하는 회원 여러분, 유난히 무더웠던 여름도 시간앞에 꼬리를 내리고 높게 펼쳐진 하늘에서 가을이 성큼 다가 오고 있음을 느낍니다.

오늘 우리는 역사와 교육의 전당 호남대학교에서 학회의 새로운 탄생을 위한 재도약의 기회를 갖고자 합니다. 2006년 학회 창립부터 2015년에 한국연구재단 등재지로 선정되는 쾌거를 이루어 물리치료학문의 발전에 크게 기여하는 학회로 우뚝 섰습니다. 이 모두는 역대 학회장님들과 임원진 및 회원 여러분들 모두의 열정과 노력의 결과였습니다.

시대가 빠르게 변화하고 있습니다. 물리치료를 둘러싸고 있는 국.내외 환경도 크게 변화하고 있습니다. 후발 학회들의 도전이 거세게 몰려오고 있습니다. 대한물리의학회도 이러한 변화에 맞추어 국제적인 수준의 학회지로의 격상을 선언하고 준비하고 있습니다. 이사장님, 편집위원장님, 이사님들 모두 혼연일체가 되어 차근차근 과정을 밟아가고 있습니다. 무엇보다도 회원여러분들의 지속적 관심과 참여가 필요합니다.

대한물리의학회 회원 여러분,

우리 학회는 회원 여러분들의 동반자로서, 물리치료학문의 발전을 위한 모든 노력과 항상 함께 할 것이며, 여러분들의 관심과 참여만이 대한물리의학회를 발전시킬 수 있을 것임을 알고 있습니다.

끝으로 학회 준비에 노력해 주신 이사장님, 편집위원장님, 이사님들께 감사의 말씀 올립니다. 특히, 이곳 호남대에서 학회가 개최될 수 있도록 배려를 아끼지 않은 이현민 교수님을 비롯한 호남대 관계자분들게 사의를 표합니다.

학회 회원 모두의 건승을 기원합니다

대한물리의학회장

이학박사 **황보 각**

축사

존경하는 대한물리의학회 회원여러분! 반갑습니다.

길었던 무더위가 끝나고 만물이 결실하는 가을의 시작을 맞이하여 회원 여러분들의 적극적인 참여하에 오늘 이곳 광주에서 대한물리의학회 추계학술대회를 개최하게 됨을 진심으로 축하드립니다.

전반기를 돌아보면 협회 내에는 많은 일들이 있었고, 대외적으로도 큰 변화의 물결이 있었습니다. 그 물결 속에서 중앙회 임원들과 각 시도회 임원들, 그리고 학회 임원들은 맡은 바 소임을 다하기 위해 최선의 노력을 기울여 왔습니다.

이번에 많은 분들의 수고와 노력의 결실로 말미암아 '발달재활서비스 제공 인력의 자격 및 인정 절차 기준'에 대한 보건복지부 고시(제 167호)가 완료되었습니다. 이번 보건복지부 고시로 말미암아 이제 의료법과 의료기사 등에 관한 법률이 아닌 장애아동 복지지원법에 적용을 받는 새로운 분야가 공식적으로 열리게 되었습니다!

방문재활 급여신설에 대한 법안과 노인복지시설 관련법이 발의되어 있으며, 보건지소에 물리치료실을 설치하여 일자리 확충은 물론 무의촌 지역에 공중보건 물리치료사 파견을 위한 법안 발의도 준비하고 있습니다.

협회의 이러한 대외적 활동과 더불어 우리 대한물리의학회 소속 회원여러분의 역할도 매우 중요한 시점입니다. 무엇보다 대한민국 물리치료학문의 선진화와 국제화를 위해 대한물리의학회가 앞장서 주시길 부탁드립니다.

이번 추계학술대회를 통해 물리치료사의 사회적 역할과 책임을 다하고 질적 향상을 이루어 나가는 소중한 시간이 되길 진심으로 기원합니다!

끝으로, 참석하신 모든 회원 가정의 행복과 회원들의 건승을 기원합니다. 감사합니다.

2018년 9월 15일

사단법인 대한물리치료사협회장 **이태식**

축사

안녕하십니까? 사단법인 대한물리치료사협회 광주광역시회장을 맡고 있는 김승래입니다.

먼저 오늘 귀한 날에 축사의 기회를 주신 대한물리의학회 황보각 학회장님과 임원 여러분께 감사의 말씀을 드립니다. 이번 학술대회를 예향의 도시, 멋과 맛의 도시인 이곳 광주에서 개최하게 된 것을 개인적으로 영광으로 생각하고 지역의 명문사학인 호남대학교를 방문해 주신 모든 회원들을 환영합니다.

대한물리의학회가 설립된 지 12주년이 되었는데 제 느낌은 이보다 더 오랜 역사를 가진 학회라는 느낌이 들 정도로 그간의 활동이 우리 물리치료계에서 피부에 와 닿을 정도로 중요한 역할을 해 주었다는 것을 반증하는 것이라 생각됩니다. 이러한 노력들 통해 2015년에 한국연구재단 등재지에 선정되는 결과는 모두에게 기쁨이 되었습니다. 이렇게 되기까지 수고해주신 현재 그리고 선임 임원분들께 감사의 마음을 전합니다.

요즘 한국의 물리치료학계는 격변하는 국내외의 상황들과 함께 매우 다양한 문제들로 도전과 개혁이 요구되는 시기가 아닌가 합니다. 그러기에 한국의 모든 학회들과 그 구성원들의 관심과 협력이 필요하다고 생각됩니다. 저는 대한물리치료사협회 광주광역시회장직을 수행하면서 국내의 학술 분야를 비롯하여 현재 물리치료의 정책이 가지고 있는 많은 문제점과 어려움을 확인하였고, 이것들을 조금이나마 발전적으로 개선함으로써 대한민국의 모든 물리치료사가 늘 국민의 곁에서 함께하고 전문가로서 인정받는 그 날이 올수 있도록 최선을 다하는 각오로 임하고 있습니다. 황보각 학회장님을 중심으로 대한물리의학회의 모든 구성원들이 한국 물리치료의 발전에 기반이 될 수 있는 다양한 학문분야의 연구활동과 국제적 수준 향상을 위해 끊임없는 노력을 해 주시길 기대합니다.

오늘 학술대회에서 발표되는 우수한 논문들과 특강들을 준비해 주신 모든 발표자 분들의 노고와 열성에 박수를 보내며, 의미있는 오늘 하루가 개인과 학회, 대한민국 물리치료의 역량을 키워나가는 소중한 시간이 되시길 바랍니다.

감사합니다.

2018년 9월 15일

사단법인 대한물리치료사협회 광주광역시회 회장 **김승래** 배상개회사

특강 1

Current perspective in Pulmonary & Cardiac Rehabilitation, Sydney, Australia

/ Yun-a Han

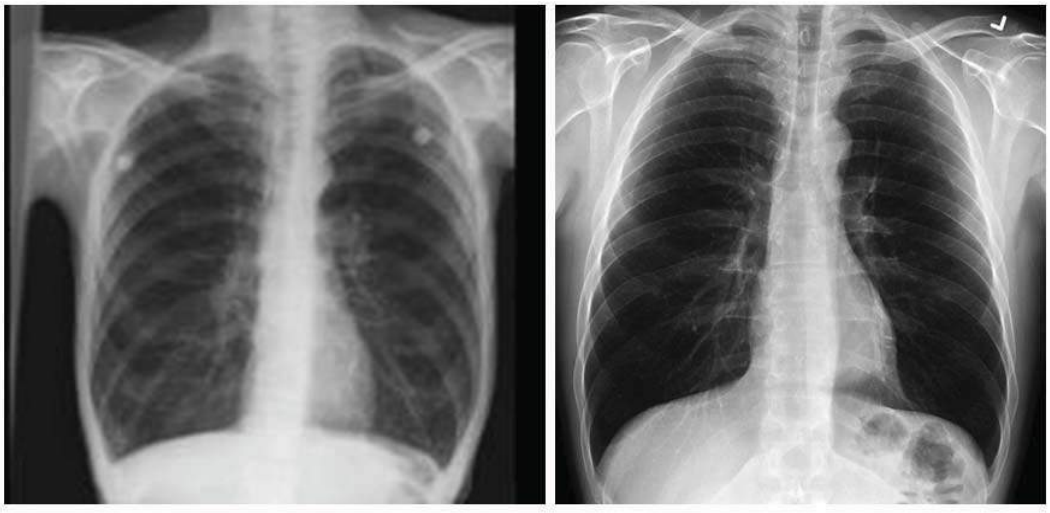
Current perspective in Pulmonary & Cardiac Rehabilitation, Sydney, Australia

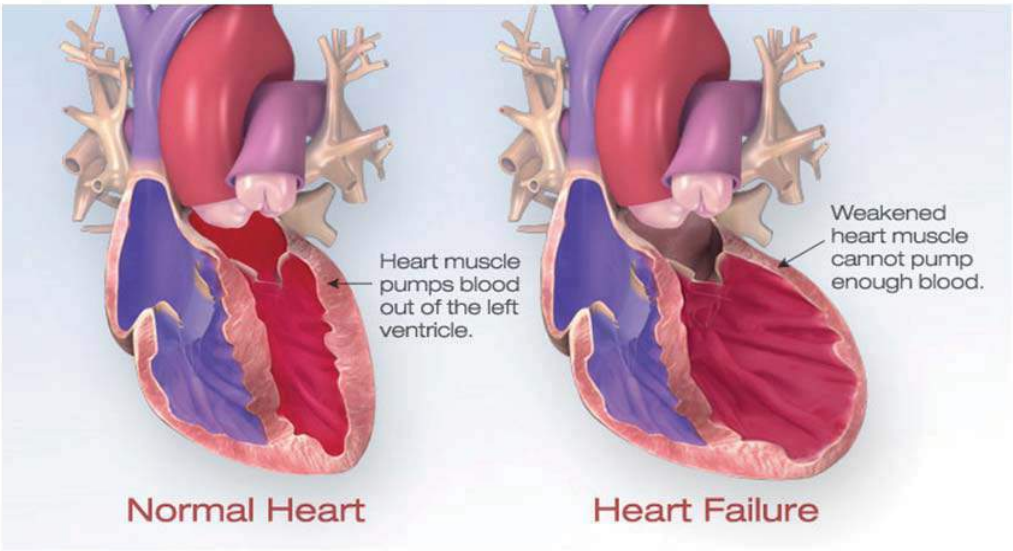
Yuna Han
Senior Physiotherapist in
Pulmonary and Chronic Disease Rehabilitation

Pulmonary Rehabilitation Coordinator , Canterbury Hospital
&
Case Manager for Respiratory Chronic Care Program (Physiotherapy Leader)
Royal Prince Alfred Hospital

SYDNEY LOCAL HEALTH DISTRICT

Hyperinflated lungs VS Normal lungs





AHA Media Player. © 2018, American Heart Association, Inc. Interactive Cardiovascular Library. Seen on 07/08/2018.
https://watchlearnlive.heart.org/CVML_Player.php?moduleSelect=hrtflr

Terminology

- VO2: oxygen uptake – volume of oxygen consumed per minute
- VO2 max: Maximal oxygen uptake. Criterion measure for cardiorespiratory fitness (CRF)

- VO2 peak: Peak oxygen uptake – peak volume of oxygen consumed per minute

Terminology

- SOB: Shortness of breath
- SOBOE: Shortness of breath on exertion
- Dyspnoea: sensation of shortness of breath or difficulty breathing
- Breathlessness = dyspnoea
- SpO2 = oxygen saturation as measured by pulse oximeter
- SaO2 = oxygen saturation as measured by blood analysis (e.g. a blood gas)
- PaO2 = partial pressure of oxygen in the blood, as measured by blood analysis

Definition of rehabilitation

- "a process aimed at enabling persons with disabilities to reach and maintain their optimal . . . functional levels . . . ." (WHO1.)

1. CONCEPT PAPER WHO Guidelines on Health-Related Rehabilitation(Rehabilitation Guidelines)
http://www.who.int/disabilities/care/rehabilitation_guidelines_concept.pdf. Seen on 25/07/2018

Why need rehabiltiation?

- Respiratory patient: COPD

(Chronic Obstructive Pulmonary Disease)

  - Impairment: Altered mechanics of breathing/ SOB upon limited activity/ Reduced gas movement
  - Activity limitation: inability to walk without SOBOE/ unable to perform work due reduced exercise tolerance with increased SOBOE/ increased Work of breathing/wheezy
  - Participation restriction: can not continue job, housework, or participate in recreational pursuits/ social activities, e.g. family outing, dinning

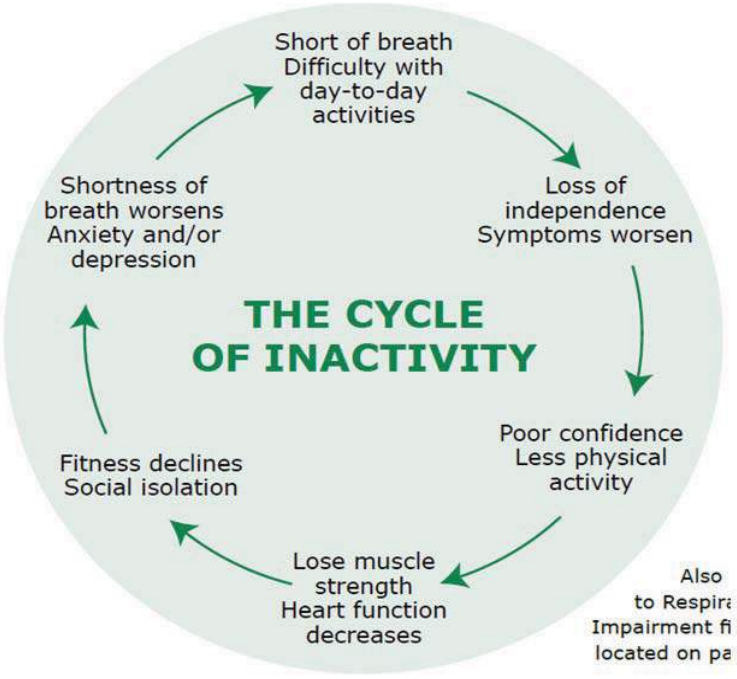
Dyspnoea in different conditions[1]

Rapid Brething	Chronic heart Failure
Incomplete exhalation	Asthma
Shallow breathing	Restrictive diseases
Increased work/effort	COPD, interstitial lung disease, neuromuscular disease, chest wall diseases
Suffocation	Chronic heart failure
Air hunger	COPD, chronic heart failure
Tight chest	Asthma
Heavy breathing	Asthma

1. *Ambrosino, N., et al.* Dyspnoea and its measurement. Breathe, December 2004, Volume 1 , No 2. p.101-107.

Why need rehabilitation?

- Cardiac patient: AMI
  - Impairment: death of heart mms(reduced pump), reduced blood supply(angina)
  - Activity limitation: inability to walk to shops without angina/ unable to perform arm work for job
  - Participation restriction: cannot continue job/ cannot participate in recreational pursuits



Lungs in Action instructor's manual

Pulmonary and Cardiac Rehabilitation Sydney, Australia

- Stage One(Acute): Inpatient, 7 to 14 days
- Stage two (Subacute) : outpatient setting, 5 to 12 weeks
- Stage Three: community setting, Maintenance exercise class, e.g. Lungs in Action, Heart movers, Shares, etc.

What is Pulmonary Rehabilitaiton[1]?

- Pulmonary Rehabilitation (PR)
  - Comprehensive program for people
    - with chronic lung disease of symptom of Shortness of Breath
    - Difficult to do activities of daily life, e.g. walking, gardening, cleaning, dressing, showering, etc.
    - Aim: to improve physical and social welling
- Evidence
  - Breathing easier
  - Improvement in walking
  - Improving Quality of Life and Mood
  - Stay out of hospital

1. Fact Sheet: Pulmonary Rehabilitation, Lung Foundation Australia (www. Lungfoundation.com.au), seen on 05/08/2018.
2. Spruit M, et al. An official ATS/ERS statement: key concepts and advances in pulmonary rehabilitation Am J Respir Crit CareMed. 2013 Oct 15;188(8):e13-64.

What is Cardiac Rehabilitation?

- Medically supervised program to help people recover from heart attack, heart surgery and other procedures (angioplasty an Stent insertion)[1 & 2.]
- Lately, the increased demand for people of Heart Failure
- Current Trend of Cardiac Rehab in outpatient settings
  - Fast Stream
  - Slow stream
- Aim: to improve overall health and to prevent future heart problems

1. National Heart Foundation of Australia and Australian Cardiac Rehabilitation Association. Recommended framework for cardiac rehabilitation. Melbourne: National Heart Foundation of Australia, 2005.
2. National Heart Foundation of Australia. Improving the delivery of cardiac rehabilitation in Australia, 2014.

Aims of PR and CR

- General:
  - Maximise physical, psychological and social functioning
  - Introduce & encourage behaviours to minimise disease progression
- Specific aims:
  - Increase exercise tolerance
  - Increase participation in everyday activities
  - Improve mood, motivation & QOL
  - Improve adherence to recommended treatments
  - Improve survival
  - Develop skills for long term behaviour change

Types of patients referred

CR	PR
Post stent or angioplasty	COPD
Post AMI	Bronchiectasis
Post CABG/AVR/MVR, etc.	Cystic Fibrosis
Post Heart transplant	Restrictive Lung Disease/ ILD/ IPF
Chronic Heart Failure	Pre and Post Lung Transplant
Angina(Not all the time)	Pre and post operation: Lung volume reduction or Endobronchial valve implantation
PPM/ ICD	Chronic Asthma
Pulmonary Artery Hypertension Chronic Heart Failure Obesity related SOB	
Other Cardiac disease including diabetics	Others

Benefits from PR and CR

- Increased physical fitness & functioning
- Reduced breathlessness
- Improved quality of life
- Improved mood and motivation
- Improved knowledge of lung or heart condition
- Improved ability to manage lung or heart condition
- Improved the management of cholesterol
- Increased participation in everyday activities
- Reduced hospital admissions
- Reduced length of stay in hospital

General Information of PR and CR

General Information

- Minimum staffs
  - Physiotherapist or Accredited Exercise physiologist who is able to perform exercise test and to train people with chronic lung disease and must be competent with CPR.
- Staff Ratio: No standard ratio of staff to patients.
  - PR: depending on disease severity, 1 to 4 to 1 to 8
  - CR: depending on disease severity and the group size, 1:5
    2 staffs working together.

Essential equipment [1]

Minimal Requirement	Recommended requirement	Optional
Pulse Oximeter Sphygmomanometer Stopwatch Walking track Hand weights/theraband Chairs Weight Scale Defibrillator (For CR) or **Emergency plan**	Stairs/steps Polar heart rate monitor Portable oxygen and nasal prongs Spirometer (For PR) Wheeled walker (rollator) ECG (3 leads)	Weights machine /multigym Stationary cycle Treadmill

To measure SpO2

Forehead Pulse Oximeter

Finger Pulse Oximeter

Ear Lobe Pulse Oximeter

- Observation

Program of PR and CR

Outline of PR and CR

- Referrals
  - hospital, GP, Specialist, Allied Health professionals, Self or family
- Accept referrals
- Contact Clients to make an appointment
  - Post d/c from a current exacerbation: within 28 days
  - Cardiac procedure: depending on the procedure
- Assessment during an Initial assessment
- Exercise training and education with various topic
  - Outpatient/ Community VS Home exercise program
- To attend twice a week for 5 to 12 weeks
  - 1.5 hours to 2 hours per program
  - PR: 8 to 12 weeks
  - CR: 5 to 8 weeks.
- Final assessment
- Program evaluation and referring to Maintenance class in a community based group exercise

During an initial assessment : PR	During an initial assessment : CR
History Taking/ History of Present Illness (HPI) Diagnosis Recent Hospitalisation: Why or complication during admission Other Comorbidities Current Medications including O2 Details of Medical Professionals and when was the last appointment or New appointment Auscultation, Ankle Oedema, breathing pattern Sputum: colour and quantity BMI History smoking: current, never or ex Social History/ Accommodation/ ADL(Activities of Daily Living) walking aid Limitations in daily living Nutrition – lower BMI or High BMI Exercise test: 6 Minute walking test	
Cough Spirometry Other exercise test: - x 5 Sit to stand	To check stability of sternotomy/ wound care Waist girth ECG
Goal setting: what client want and what clinician want Is the goal realistic to achieve it? Smart goal	
Intervention:	

Health Related Quality of Life Questionnaires (HRQOL)

HRQOL – PR

- St George Respiratory Questionnaires
  - 0 to 100 (100: poor HRQOL)
  - 3 different sections: symptoms/ activity/ impacts
  - Minimal Importance Difference (MID): 2
- Chronic Respiratory Disease Questionnaire (CRQ)
  - Measuring physical functional and emotional limitations due to chronic lung disease.
  - Not shown long term disease progress
  - MID: 0.5 each domain
- COPD Assessment Test (CAT)
  - 8 questions with scores from 0 to 40.
  - Validated. Sensitive t changes in PR.
  - MID: 2

HRQOL- PR (psychosocial)

- Patient Health Questionnaire (PHQ-9)
  - Screener for Depression
  - Cut score of 8: diagnosed depression
- Hospital Anxiety and Depression Scale (HADS)
  - 14 items: 7 anxiety and 7 Depression

HRQOL – CR

- Medical Outcomes Short Form-36 or 12 Quality of Life
- MacNew heart disease Quality of Life Instrument
- Psychosocial
  - PHQ-9
  - HADS

Spirometry:
for diagnosis of COPD
Post bronchodilator
FEV1/FVC < 70%
Essential:
Age, Gender, Height &
Ethnic background

Spirometry

- Australian Classification1.

Stage	Spirometry (post bronchodilator)
I – Mild COPD	FEV_1 / FVC < 0.7 and FEV_1 60% to 80% predicted
II – Moderate COPD	FEV_1 / FVC < 0.7 and FEV_1 40% to 59% predicted
III – Severe COPD	FEV_1 / FVC < 0.7 and FEV_1 below 40% predicted

- GOLD Classification 2.

Classification of Severity of COPD (post bronchodilator FEV1)		
In clients with FEV1/FVC ≤ 70%		
GOLD 1	Mild	FEV1≥ 80% predicted
GOLD 2	Moderate	50 ≤ FEV1 < 80% predicted
GOLD 3	Severe	30 ≤ FEV1 < 50% predicted
GOLD 4	Very Severe	FEV1 < 30% predicted

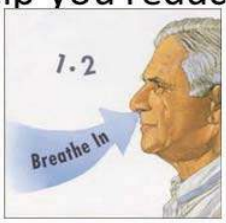
- Pre and post spirometry: pre test, inhalation of bronchodilator (e.g. Ventolin), 15 minutes later, post test.

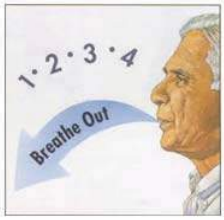
1. The COPD-X Plan: Australian and New Zealand Guidelines for the management of Chronic Obstructive Pulmonary Disease 2018. https://copdx.org.au/wp-content/uploads/2018/08/COPDX-V2-54-June-2018.pdf. Seen on 25/08/2018.
2. Global Initiative for Chronic Obstructive Lung Disease : Pocket guide to COPD Diagnosis, Management and Prevention. A guide for health Care Professionals. 2018 Report. https://goldcopd.org/wp-content/uploads/2018/02/WMS-GOLD-2018-Feb-Final-/top/rint-v2.pdf Seen on 03/08/2018.

Breathing Techniques

Pursed Lip Breathing

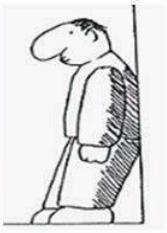
- Breathe in and out at a comfortable pace
- Concentrate on relaxing your shoulders, back & upper chest
- Use pursed lip breathing as shown in picture below. This will help you slow your breathing rate down and help you reduce your breathlessness.





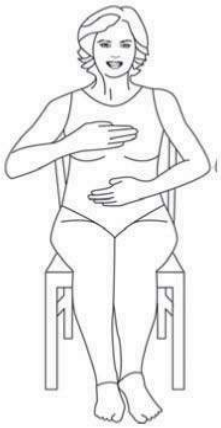
https://www.breathinglabs.com/improve-your-breathing seen on 01/08/2018.

Recovery Positions



Controlled Breathing(Diaphragmatic)

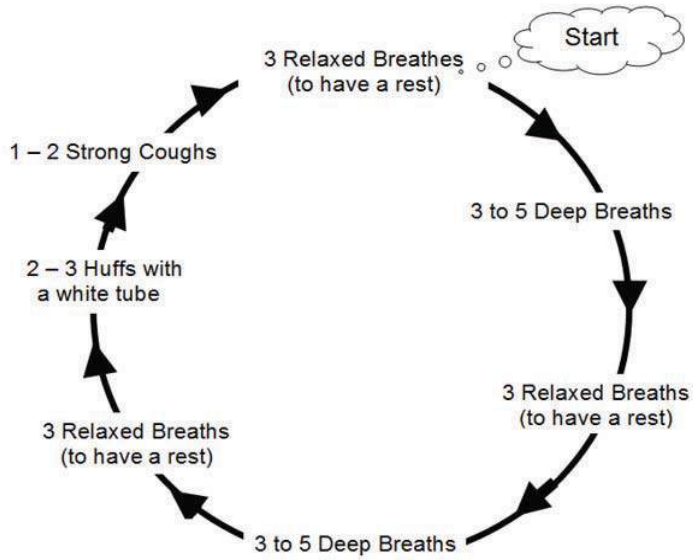
- To practice relaxed breathing, place one hand on your chest and one hand on your stomach at the level of your navel while sitting.
- When you take a deep breath in, the hand on your stomach, rather than the hand on your chest, should move first.
- Practice breathing so that the hand on your stomach moves first.



Breathing with Daily Activities

- Lung disease consume more energy simply breathe.
- Important to coordinate breathing with activities.
- Standing Up
  - Breathe in before you move. Breathe out as you rise up from your seat.
- Lifting an object above your head
  - Breathe in before you lift. Breathe out as you lift your arms above you.
- Putting on shoes
  - Breathe in before you move. Breathe out as you bend down to put on your shoe

ACBT
Active Cycle of Breathing Techniques



Assessment of Exercise Capacity

Exercise Tests

- Validated Field Test
  - The 6 Minute Walking Test (6MWT): Functional test not submaximal test.
  - The incremental Shuttle Walk Test (ISWT)
  - The Endurance Shuttle Walk Test (ESWT)
- Others
  - X5 Sit to stand from 48 cm height chair
  - Exercise Stress Test
  - Cardiopulmonary Exercise Test(CRET)
  - 4 Meter walking test

6 Minute Walking Test as guidance of prescription of exercise

6 Minute Walking Test[1 and 2]

- **Functional test not submaximal test.**
- 30 meters walking track recommended
- **Continuous measure of SpO2 and PR during test**
- 2 tests between 30 minutes of rest due to learning effect
- At rest: to measure BP, SpO2, PR and Borg Scale
- During the test: each minute, to measure SpO2 and PR
- At 6 Minutes: to measure SpO2, PR and Borg Scale
- 2 Minutes post the test: BP
- To measure Spo2/ PR/ Borg when stops
- Encouragement
- Limiting Factors to the test:.e.g. pain

1. Singh , S. J. et al., 2014. An official systematic review of the European Respiratory Society/American Thoracic Society: measurement properties of field walking tests in chronic respiratory disease. European Respiratory Journal, December, 44(6), pp. 1447-1478.

2. Holland, A. E. et al., 2014. An official European Respiratory Society/American Thoracic Society technical standard: field walking tests in chronic respiratory disease. European Respiratory Journal, December, 44(6), pp. 1428-1446

Borg Scale

Breathlessness/Borg scale	
0	Not short of breath
0.5	Very very slight
1	Very slight
2	Slight
3	Moderate
4	Somewhat severe
5	Severe
6	
7	Very Severe
8	
9	Very very severe (almost maximal)
10	Maximal

Borg Scale.

- Borg G. Perceived exertion as an indicator of somatic stress. Scand J Rehab Med. 1970;2:92-9; Borg G. Psychophysical bases of perceived exertion. Med Sci Sports Exer. 1982:14:377-81; Mahler D. The measurement of dyspnoea during exercise in patientswith lung disease. Chest. 1992;101:242-7

Rating of Perceived Exertion

0	Nothing at all	
0.3		
0.5	Extremely weak	Just noticeable
0. 7		
1	Very weak	
1.5		
2	Weak	Light
2. 5		
3	Moderate	
4		
5	Strong	Heavy
6		
7	Very strong	
8		
9		
10	Extremely strong "Maximal"	
11		

6	
7	Very, very light
8	
9	Very light
10	
11	Fairly light
12	
13	Somewhat hard
14	
15	Hard
16	
17	Very hard
18	
19	Very, very hard
20	

Exercise prescription based on 6 MWT

Exercise prescription - PR

- **Walking training intensity**
  - Recommendation: 80% of the average six-minute walk test (6MWT) speed or 70% of the peak speed achieved on the incremental shuttle walk test (ISWT) (see below how to calculate walking intensity from the results of a ISWT) 1 & 2
  - 6 MWDT
    - Total distance: 360 meters(2 stops due to SOB)
    - Borg scale: 4 /10
    - Prescription:
      - One minute distance: (360 ÷ 6) = 60 meter
      - 20 minute distance: 20 x 60 = 1200 meters
      - 80% of 1200 = **960 meters.**
      - Walking track, 40 meters= 960 ÷ 40 = 24 laps
      - First couple of times: may start from 5 minutes then, gradual increase it.
- **Treadmill**
  - 80% x 6 MWT average speed
- **Bike**
  - Recommendation of intensity to prescribe cycle" at least 60 T of the Peak work rate on incremental symtom-limted cycle ergometry test
  - Based on the 6MWT the following equation will give an estimate of the patient's peak work rate (ref Hill).
  - Calculate 60% of this value as a starting intensity for cycle training. As this is only an estimated intensity, titrate the work rate so that the patient's dyspnoea or rate of perceived exertion score is 3-4 on the Borg 0-10 scale

1.Zainuldin, R., Mackey, M. G. & Alison, J. A., 2015. Prescription of walking exercise intensity from the 6-minute walk test in people with chronic obstructive pulmonary disease. Journal of Cardiopulmonary Rehabiliation and Prevention, 35(1).

2.Zainuldin, R., Mackey, M. G. & Alison, J. A., 2012. Prescription of walking exercise intensity from the incremental shuttle walk test in people with chronic obstructive pulmonary disease. American Journal of Physical Medicine & Rehabilitation, July, 91(7).

3. Zainuldin, R., Mackey, M. G. & Alison, J. A., 2016. Prescribing Cycle Exercise Intensity Using Moderate Symptom Levels in Chronic Obstructive Pulmonary Disease. *Joural of Cardiopulmonary Rehabilitation and Prevention*, 36(3), pp. 195-202.

Predicted Normal Value

- Australia : Predictive equation 1
  - for males: 6MWD(m) = 867 – (5.71 age, yrs) + (1.03 height, cm)
  - for females: 6MWD(m) = 525 – (2.86 age, yrs) + (2.71 height, cm) – (6.22 BMI).
- generated and verified in a local population should be applied where possible 2

1. Jenkins, S. et al., 2009. Regression equations to predict 6-minute walk distance in middle-aged and elderly adults. *Physiotherapy Theory and Practice*, October, 25(7), pp. 516-522.

2. Singh , S. J. et al., 2014. An official systematic review of the European Respiratory Society/American Thoracic Society: measurement properties of field walking tests in chronic respiratory disease. European Respiratory Journal, December, 44(6), pp. 1447-1478(Reference equations)

Exercise prescription – CR

- Based on Rated Perceived Exertion & 6MWT
- RPE 11 (Fairly light)
  - Walking speed: 100% of 6 MWT
- RPE 12 – 14 (somewhat hard) 90% of 6 MWT
- RPE ≥ 14 : 80% of 6 MWT
- Exercise prescription with HF
  - NYHA I – II: RPE 11 to 14 (moderate intensity)
  - NYHA III – IV : RPE ≤ 13

Exercise training

Supervised exercise session: Exercise Training

- To improve endurance
- To improve strengthening.
- Exercise training
  - Important component of PR and CR
  - Evidence- Based in COPD[1] and CR[2 &3].
  - Similar benefits in other respiratory conditions [1]
    - ILD(Interstitial Lung Disease)[3], CF (cystic Fibrosis), asthma, PH(Pulmonary Hypertension), Lung Cancer, Lung Volume Reduction Surgery, Lung Transplantation

1. Spruit MA, Singh S, Garvey C, et al. An official American Thoracic Society/European Respiratory Society Statement: Key concepts and advances in pulmonary rehabilitation. An Official Statement of the ATS and ERS. Am J Respir Crit Care Med 2013;188(8):e13-e64.
2. NHFA CSANZ Heart Failure Guidelines Working Group: Atherton JJ, Sindone A, De Pasquale CG, et al. National Heart Foundation of Australia and Cardiac Society of Australia and New Zealand: Guidelines for the Prevention, Detection, and Management of Heart Failure in Australia 2018. Heart Lung Circ. 2018;27(10):1123-208.
3. Taylor RS, Sagar VA, Davies EJ, et al. Exercise-based rehabilitation for heart failure. Cochrane Database of Systematic Reviews 2014, Issue 4. Art. No.: CD003331. DOI: 10.1002/14651858.CD003331.pub4.
4. Dowman LM, McDonald CF, Hill CJ, Lee AL, Barker K, Boote C, Glaspole I, Goh NSL, Southcott AM, Burge AT, Gillies R, Martin A, Holland AE. The evidence of benefits of exercise training in interstitial lung disease: a randomized controlled trial. Thorax 2017;72: 610–619.

PR: Exercise Training Guideline[1]

- Frequency: 4 to 5 times a week
- Intensity: 60% of maximal work rate, progressing to 80% maximal work rate
- Time: 20 to 60 minutes per session
- Type: focus on Large muscle, e.g. walking/ cycling/ Treadmill/Rowing machine
- Progression: Gradual progression, E.g. Borg scale 3 to 4
- Must include walking with aim of 20 to 30 minutes.

- Spruit MA, Singh S, Garvey C, et al. An official American Thoracic Society/European Respiratory Society Statement: Key concepts and advances in pulmonary rehabilitation. An Official Statement of the ATS and ERS. Am J Respir Crit Care Med 2013;188(8):e13-e64.

CR: Exercise Training Guideline[1]

- **Patients'/ Clients' safety are the first priority.**
  - **Monitoring symptoms, modify intensity, etc.**
- **Stable Angina**
  - 1 to 2 weeks post diagnosed.
- **Percutaneous procedures**
  - 1 to 2 weeks post the procedure
  - Resistance exercise at least 2 to 3 weeks later.

Guidelines for Exercise Program Participation. *www.heartonline.org.au/resources. Seen on 08/08/2018.*

CR: Exercise Training Guideline[1]

- **Myocardial Infarction**
  - Aerobic exercise/ ROM: 1 to 2 weeks post procedure
  - Supervised endurance training 4/52 post event.
- **Cardiac Surgery**
  - Aerobic training, ROM: 1 to 2 weeks post procedure
  - Supervised endurance training (outpatient): 4/52 post the surgery
  - Resistance exercise: minimum 5 weeks post the procedure depending on sternal stability
- **Implantable Devices:**
  - Aerobic training: 1 to 2 weeks post procedure
  - Avoid upper limb movement above the level of the shoulder: 4 to 6 weeks.
- **Compensated Heart Failure**
  - Aerobic training: 1 to 2 weeks post discharge
  - RPE: 9 to 11

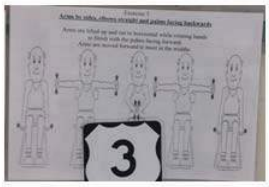
Consideration

- Client's safety
- Progression: Duration, then, intensity
- Easier in sitting than in Standing up
- Do not hold a breath
- PR: Training – Borg Scale 3 and 4
- CR: RPE

Exercise Program

- Warm up
- Aerobic
- Strengthening
- Cooling Down/ Stretching

Gym



Oxygen Therapy

Oxygen during exercise

- Clients with Long Term Oxygen Therapy
- Transporting small portable O2 cylinders: trolley, small suitcase, etc.
- Portable oxygen concentrators : to regularly monitor oxygen saturation, especially if pulse flow device is used.
- Clients desaturated during exercise test and exercise: lower than 88 % RA during 6 MWT
  - Improvement in exercise tolerance or reduced dyspnoea when using O2
  - However, recent RCT: No difference in exercise capacity or HRQOL 1
- Desaturation: moderate to high intensity walking, climbing stairs, step-ups and sit-to-stand.
- Cycling induces less oxygen desaturation than walking in patients with COPD
- Desaturation during small muscle mass exercise (e.g. arm exercise) : not very common

1. Puhan MA, Gimeno-Santos E, Cates CJ, Troosters T. Pulmonary rehabilitation following exacerbations of chronic obstructive pulmonary disease. Cochrane Database of Systematic Reviews2016, Issue 12

Oxygen

Outcome Measures

Outcome of PR

- Exercise test:
  - 6 MWD : Minimum important difference (MID) > at least 30 meters[1] Dysnoea measurement
  - mMRC: MID≥ 1 Unit
  - Borg Scale
- Quality of Life Questionnaires
  - CAT : MID = 2 unit
  - SGRQ: MID 4 units

1. Holland, A. E. et al., 2014. An official European Respiratory Society/American Thoracic Society technical standard: field walking tests in chronic respiratory disease. European Respiratory Journal, December, 44(6), pp. 1428-1446.

Outcome of CR

- Exercise test:
  - 6 MWD: Minimum important difference [1 & 2]
    - CHF: 36 meters
    - CAD: 25 meters
- Rated Perceived Exertion
- Waist Circumference
- BMI
- Level of Cholesterol
- Quality of Life Questionnaire

1. Gremeaux V, Troisgros O, Benaim S, et al. Determining the minimal clinically important difference for the six-minute walk test and the 200-meter fast-walk test during cardiac rehabilitation program in coronary artery disease patients after acute coronary syndrome. Arch Phys Med Rehabil 2011;92:611-619.

2. Tager T, Hanholz W, Cebola R, et al. Minimum important distance for 6-minute walk test distances among patients with chronic heart failure. Int J Cardiol 2014;176:94-98.

Case Study1

- 60 years old of man with severe COPD
- Issue: increased SOBOE (Shortness of Breath on exertion),e.g. walking on flat, showering, and carrying heavy loads
- Comorbidity: Back pain # pelvic (all healed up)
- Smoking hx: ceased 3/12 ago (hx: 80pack/year),
- Respiratory medicine: Seretide, Ventolin, Spiriva Respimatt
- Shx: retired truck driver, lives with wife,
- ADL: wife assists
- Client's goal: to lose weight, back to gardening, improvement in walking
- Spirometry: FEV1/FVC = 0.63 /1.2, FEV = 22% of predicted value
- BMI: 90/1.78 = 28.4kg/m2
- At rest: SpO2, PR – 93%RA, 85 bpm,
- 6 MWT: the best from the two
  - 324 meters
  - 2 rests due to SOB
  - SpO2, nadir%: 86% RA
  - Borg (at end): 7/10

Plan for Case Study 1

- Consideration: back pain

Land Based PR and CR

- Hospital outpatient based PR and CR, focused on land based exercise

New trends

- Hydrotherapy in Pulmonary Rehabilitation
- Tai Chi in Pulmonary Rehabilitation
- Remote distance: Skype based home exercise for heart failure, COPD
- Home based pulmonary rehabilitation
- Case Management – Cardiac Chronic Care/ Respiratory Chronic Care : Home visits by professionals Nurse/ Physiotherapist
- Self Management
- Telehealth
- Advanced Technology: Smartphone App

Tai Chi

[1]Tai Chi

- Tai Chi has short-term benefits on exercise capacity, balance, muscle strength and health-related quality of life in people with chronic obstructive pulmonary disease (COPD) after a 12-week training program.
- The exercise intensity of short-form Sun-style Tai Chi reached a moderate level of intensity of 64% VO2peak or 53% of VO2 reserve in people with COPD who performed Tai Chi at a moderate level of dyspnoea or perceived exertion.
- People with COPD should be encouraged to try alternative exercise interventions particularly if conventional pulmonary rehabilitation is not available. Bringing alternative exercise interventions such as Tai Chi to mainstream practice may be an important strategy to manage the growing numbers of people with COPD.
- There are many different styles of Tai Chi. More studies are needed to determine the most suitable style of Tai Chi for improving exercise capacity and HRQoL in people with COPD.
- Until further research is conducted, the ability to adhere to Tai Chi training in the long-term and the benefits attained from long-term adherence in people with COPD remains unknown.

1. Leung, R, et al. Tai Chi as a form of exercise training in people with chronic obstructive pulmonary disease. Expert Rev. Respir. Med. 7(6), 587–592 (2013)

Hydrotherapy in Pulmonary Rehabilitation[1]

- Clients with COPD and with coexisting obesity or musculoskeletal or neurological conditions
  - water-based exercise training significantly increased 6-min walking distance, incremental and endurance shuttle walk distances, and improved Chronic Respiratory Disease Questionnaire (CRDQ) dyspnoea and fatigue
  - In people with physical comorbid conditions, training in water may not improve walking speed as much as endurance walking capacity, thus the ESWT may be more sensitive to change than the 6MWT following water-based exercise training in people with physical comorbidities

1. McNamara, R., et al. Water-based exercise in COPD with physical comorbidities: a randomised controlled trial, Eur Respir J 2013; 41: 1284–1291

Hydrotherapy and Chronic Heart Failure[1]

- Recommendation
  - Decompensated heart failure: Absolute contraindication
  - Thermoneutral water
  - Severe CHF
    - No deeper than xiphisternum with upright position
  - Patients to require at least a $VO2_{max}$ of 15mls/kg/min & anaerobic threshold of >10m/kg/min during a symptom limited exercise stress test : considered to be safe for gentle exercise in water
  - Inappropriate HR response during exercise stress test: highlight added caution+++

Home base Pulmonary Rehabilitation

- Assessment at a hospital based pulmonary rehabilitation – preferred to do it at home
  - Including 6 minute walking test.
- Home visit: prescribed exercise and check them
- Every week for 7 weeks: telephone follow-up
- Final assessment: at the hospital based PR
- Advantage: No drop out.

Reference:PR

- Pulmonary Rehabilitation Toolkit: https://pulmonaryrehab.com.au
- Lung Foundation Australia: https://lungfoundation.com.au
- Home base pulmonary rehabilitation: http://homebaserehab.net/
- American Association of Cardiovascular and pulmonary rehabilitation (AACVPR) https://www.aacvpr.org
- ATS/ ERS Statement
  - An official European Respiratory Society/American Thoracic Society technical standard: field walking tests in chronic respiratory disease (2014).Holland, E.ets.

Referrece:PR

- Spruit M, et al. An official ATS/ERS statement: key concepts and advances in pulmonary rehabilitation Am J Respir Crit CareMed. 2013 Oct 15;188(8):e13-64.
- McCarthy B, Casey D, DevaneD, et al. Pulmonary rehabilitation for chronic obstructive pulmonary disease. Cochrane Database Syst Rev 2015; 2: CD003793.
- Holland, A, et al. Home-based rehabilitation for COPD using minimal resources: a randomised, controlled equivalence trial. Thorax 2016; 0:1-9

Reference: 6 MWT/ISWT/ESWT

6 MWT

- Singh , S. J. et al., 2014. An official systematic review of the European Respiratory Society/American Thoracic Society: measurement properties of field walking tests in chronic respiratory disease. European Respiratory Journal, December, 44(6), pp. 1447-1478.
- Holland, A. E. et al., 2014. An official European Respiratory Society/American Thoracic Society technical standard: field walking tests in chronic respiratory disease. European Respiratory Journal, December, 44(6), pp. 1428-1446

ISWT

- Incremental Shuttle Walking Test (ISWT), https://www.respiratoryfutures.org.uk/media/69833/iswt-sop-cers.pdf. Seen on 25/08/2018
- https://www.leicestershospitals.nhs.uk/aboutus/departments-services/pulmonary-rehabilitation/for-health-professionals/incremental-shuttle-walk Seen on 25/08/2018
- Singh SJ, Morgan MDL, Scott S, et al. Development of a shuttle walking test of disability in patients with chronic airways obstruction. Thorax 1992;47:1019-24
- Singh SJ, Morgan MDL, Hardman AE, et al. Comparison of oxygen uptake during a conventional treadmill test and the shuttle walk test in chronic airflow limitation. Eur Respir J 1994;7:2016-20
- Sewell L, Singh SJ, Williams JE, Collier R, Morgan MDL (2005). Can Individualised Rehabilitation improve functional independence in elderly patients with COPD. Chest; 128; 1194-1200.

References for ILD

1. Dowman L, Hill CJ, Holland AE. Pulmonary rehabilitation for interstitial lung disease. Cochrane Database Syst Rev. 2014;10:CD006322.

2. Raghu G, et al. An Official ATS/ERS/JRS/ALAT Statement: Idiopathic Pulmonary Fibrosis: Evidencebased Guidelines for Diagnosis and Management. Am J Respir Crit Care Med 2011; 183(6): 788-824.

3. Spruit MA, et al. An official American Thoracic Society/European Respiratory Society statement: key concepts and advances in pulmonary rehabilitation. Am J Respir Crit Care Med 2013; 188(8):e13-64.

4. Holland AE, et al. Be honest and help me prepare for the future: What people with interstitial lung disease want from education in pulmonary rehabilitation. Chron Respir Dis 2015; 12: 93-101.

Reference: CR

1. Heart Online
https://www.heartonline.org.au

2. Heart Foundation Australia
https://www.heartfoundation.org.au

3. National Heart Foundation of Australia and Cardiac Society of Australia and New Zealand: Guidelines for the Prevention, Detection, and Management of Heart Failure in Australia 2018, Heart, Lung and Circulation (2018) 27, 1123–1208

4. National Heart Foundation of Australia and Australian Cardiac Rehabilitation Association. Recommended framework for cardiac rehabilitation. Melbourne: National Heart Foundation of Australia, 2005.

5. National Heart Foundation of Australia. Improving the delivery of cardiac rehabilitation in Australia, 2014.

6. Adsett, J., et al. Evidence Based Guidelines for Exercise and chronic Heart Failure, funded by pathways Home Project 2007/2008, Queensland Government. Reviewed 2014.

7. Hwang, R., et al. Home-based telerehabilitation is not inferior to a centre-based program in patients with chronic heart failure: a randomised trial. Journal of Physiotherapy, 2017. 63(2): 101–107

특강 2

ICF 개념에 의한 임상 물리의학 임상 6 단계

/ 배성수

ICF 개념에 의한 임상
물리의학 임상 6 단계

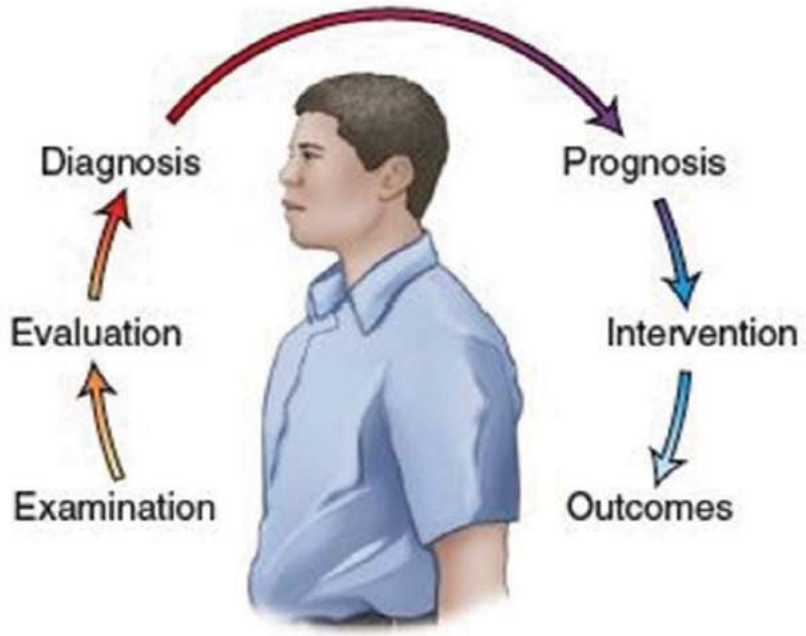
대구대학교 명예교수

배 성 수

Patient/Client Management Model (I); APTA 6 step

- Examination; history, system review.
- Evaluation ; test & measure.
- Diagnosis ;
- Prognosis ; plan of care, long term & short term goal.
- Intervention; treatment plan.
- Outcome ;

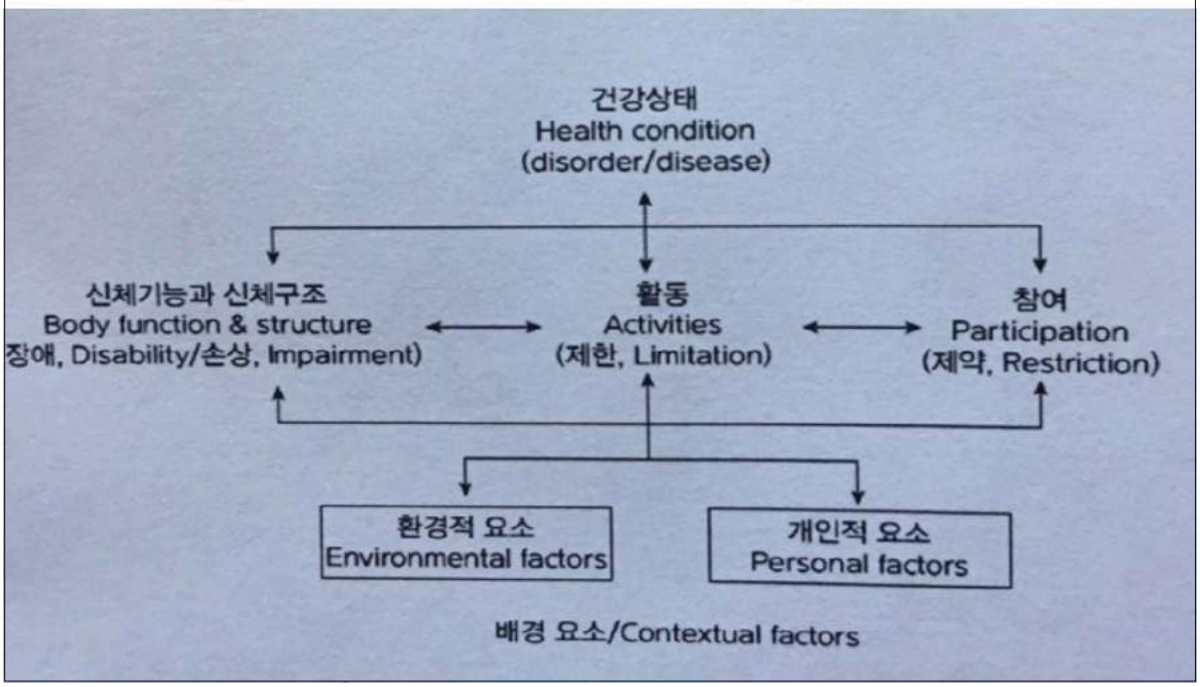
APTA 6 Step;



Patient/Client Management Model(II); By ICF concept

- Function & Structure(F & S) ; Disability & Impairment.
- Activity(A) ; Limitation.
- Participation(P) ; Restriction.

Diagnosis of ICF Concept



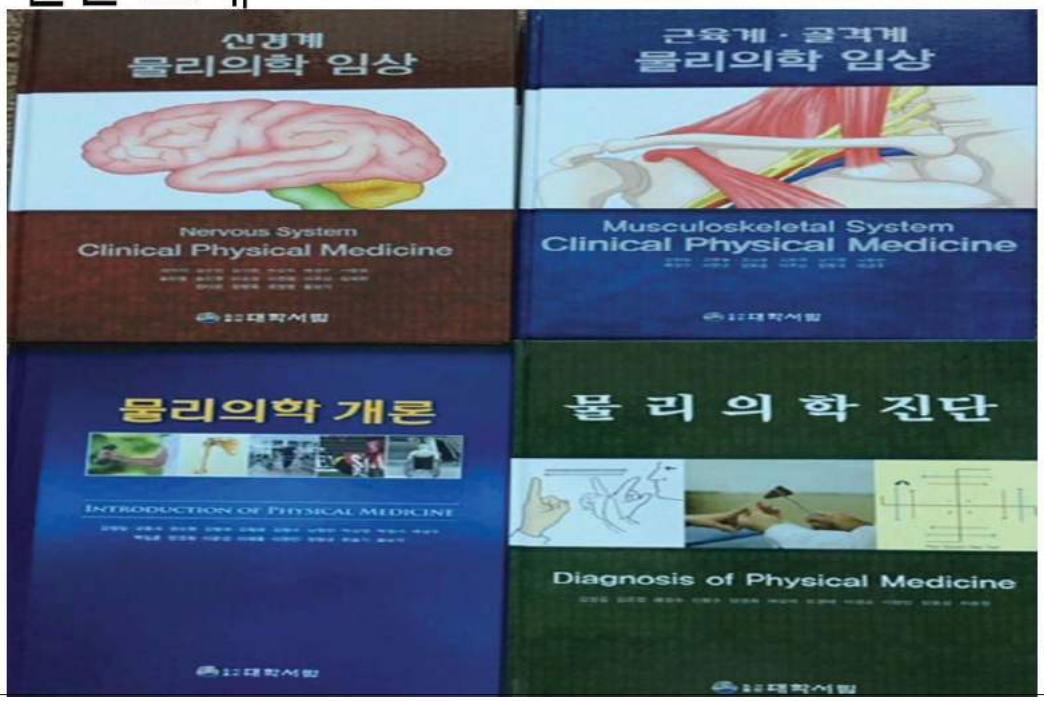
물리의학 임상 6 단계

- 1 단계; 정보수집과 분석(examination);
  ICF 코드(d4501), 의사의 처방, EMR, 과거치료, 간호사,
  직업, 취미, 주거상태, 병리검사소견, 영상정보 등.
- 2 단계; 시진, 문진(치료목표 설정), 촉진(청진, 타진 등).
- 3 단계; 물리의학 진단 및 예후 By ICF concept.
  Top down approach. " SMART " Test.
- 4 단계; 물리의학 임상 프로그램 계획 By ICF concept.
  Bottom up approach.
  Provide evidence-based practice information.
- 5 단계; 물리의학 임상(intervention).
- 6 단계; 재평가. 3단계 진단과 임상 후 진단을 비교.

ICFcord d4501(Rt.hemi or knee arthrosis)

1. Car.
2. Wheel-chair.

신간 소개



특강 3

임상시험윤리위원회(IRB)와 연구윤리의 이해

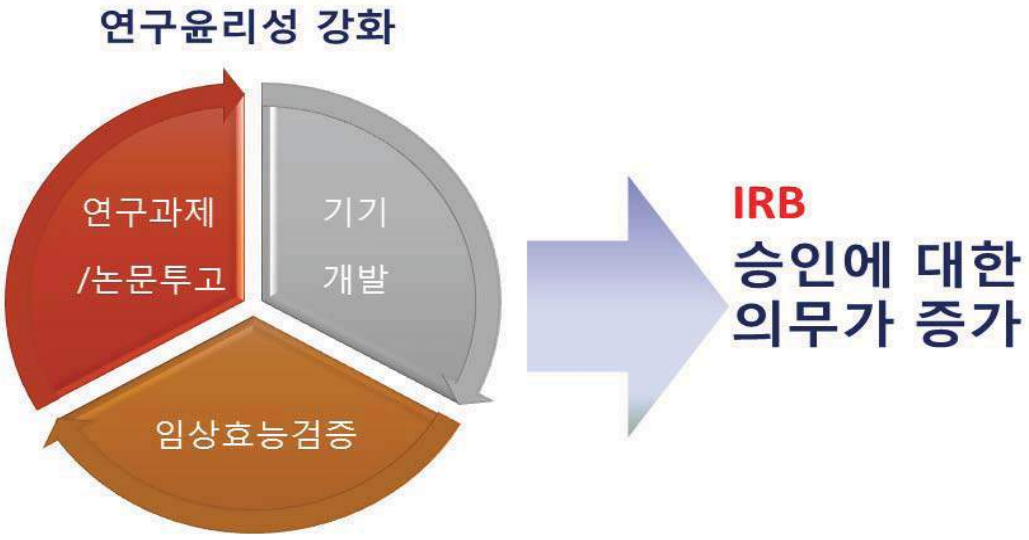
/ 박소현

임상시험윤리위원회(IRB) 와 연구윤리의 이해

영산대학교 물리치료학과 박소현

인간대상연구

연구윤리에 대한 관심 증가



인간대상연구 정의

생명윤리 및 안전에 관한 법률 제2조

"인간대상연구"란 사람을 대상으로 물리적으로 개입하거나 의사소통, 대인 접촉 등의 상호작용을 통하여 수행하는 연구 또는 개인을 식별할 수 있는 정보를 이용하는 연구로서 보건복지부령으로 정하는 연구를 말한다.
"연구대상자"란 인간대상연구의 대상이 되는 사람을 말한다.

인간대상연구의 범위

생명윤리 및 안전에 관한 법률 시행규칙 제2조

① 「생명윤리 및 안전에 관한 법률」(이하 "법"이라 한다) 제2조제1호에서 "보건복지부령으로 정하는 연구"란 다음 각 호의 연구를 말한다.

1. 사람을 대상으로 물리적으로 개입하는 연구: 연구대상자를 직접 조작하거나 연구대상자의 환경을 조작하여 자료를 얻는 연구
2. 의사소통, 대인 접촉 등의 상호작용을 통하여 수행하는 연구: 연구대상자의 행동관찰, 대면(對面) 설문조사 등으로 자료를 얻는 연구
3. 개인을 식별할 수 있는 정보를 이용하는 연구: 연구대상자를 직접·간접적으로 식별할 수 있는 정보를 이용하는 연구

② 제1항에도 불구하고 다음 각 호의 연구는 제1항 각 호의 연구에 포함되지 아니한다.

1. 국가나 지방자치단체가 공공복리나 서비스 프로그램을 검토·평가하기 위해 직접 또는 위탁하여 수행하는 연구
2. 「초·중등교육법」 제2조 및 「고등교육법」 제2조에 따른 학교와 보건복지부장관이 정하여 고시하는 교육기관에서 통상적인 교육실무와 관련하여 하는 연구

③ 제2항 각 호의 연구를 하는 연구자는 필요하다고 판단하는 경우 법 제10조제3항제1호 각 목의 사항에 대하여 다음 각 호의 위원회에 심의를 요청할 수 있다.

기관위원회의 심의를 면제할 수 있는 인간대상연구

생명윤리 및 안전에 관한 법률 시행규칙 제13조

① 법 제15조제2항에서 "보건복지부령으로 정한 기준에 맞는 연구"란 일반 대중에게 공개된 정보를 이용하는 연구 또는 개인식별정보를 수집·기록하지 않는 연구로서 다음 각 호의 어느 하나에 해당하는 연구를 말한다.

1. 연구대상자를 직접 조작하거나 그 환경을 조작하는 연구 중 다음 각 목의 어느 하나에 해당하는 연구
   가. 약물투여, 혈액채취 등 침습적(侵襲的) 행위를 하지 않는 연구
   나. 신체적 변화가 따르지 않는 단순 접촉 측정장비 또는 관찰장비만을 사용하는 연구
   다. 「식품위생법 시행규칙」 제3조에 따라 판매 등이 허용되는 식품 또는 식품첨가물을 이용하여 맛이나 질을 평가하는 연구
   라. 「화장품법」 제8조에 따른 안전기준에 맞는 화장품을 이용하여 사용감 또는 만족도 등을 조사하는 연구
2. 연구대상자등을 직접 대면하더라도 연구대상자등이 특정되지 않고 「개인정보 보호법」 제23조에 따른 민감정보를 수집하거나 기록하지 않는 연구
3. 연구대상자등에 대한 기존의 자료나 문서를 이용하는 연구

② 제1항에도 불구하고 제1항제1호 및 제2호의 연구 중 「의약품 등의 안전에 관한 규칙」 별표 4 제2호더목에 따른 취약한 환경에 있는 시험대상자 제2호더목에 따른 취약한 환경에 있는 피험자(Vulnerable Subjects)를 대상으로 하는 연구는 기관위원회의 심의를 받아야 한다. [개정 2013.3.23 제188호(약사법 시행규칙)]

인간대상연구의 기록 및 보관 등

생명윤리 및 안전에 관한 법률 시행규칙 제15조

① 법 제19조제1항에 따른 인간대상연구와 관련된 기록(전자문서를 포함한다)은 다음 각 호와 같다.

1. 연구계획서 및 법 제10조제3항제1호에 따라 해당 연구를 심의한 기관위원회의 심의 결과(변경되었을 경우에는 변경된 연구계획서와 심의 결과를 포함한다)
2. 법 제16조제1항 및 제2항에 따라 연구대상자로부터 받은 서면동의서 또는 같은 조 제3항에 따른 기관위원회의 서면동의 면제 승인서
3. 개인정보의 수집·이용 및 제공 현황
4. 연구 결과물 등이 포함된 연구 종료 보고서 및 법 제10조제3항제2호에 따른 연구의 진행과정 및 결과에 대한 기관위원회의 조사·감독 결과

② 인간대상연구자는 제1항에 따른 기록을 연구가 종료된 시점부터 3년간 보관하여야 한다.

③ 제2항에 따른 보관기간이 지난 문서 중 개인정보에 관한 사항은「개인정보 보호법 시행 령」제16조에 따라 파기하여야 한다. 다만, 후속 연구, 기록 축적 등을 위해 보관이 필요한 경우에는 기관위원회 심의를 거쳐 보관기간을 연장할 수 있다.

인간대상연구에 대한 적용

- ○ 생명윤리법 관련 연구용역 추진 시 연구용역 수행기관의 IRB 심의결과 제출 의무화
- - 인간대상연구 및 인체유래물연구 등 생명윤리법 관련 연구 수행 시 연구계획서 제출 단계에서 해당 연구기관의 IRB 심사결과(심의결과서 또는 심의면제확인서) 제출을 의무화하도록 연구용역 공고문에 게재 협조
- - IRB 심의를 통과하지 못한 연구와 IRB 심의를 거치지 않은 연구에 대해서는 해당 연구용역 입찰과정에서 제외
- - 다년도 연구의 경우 1년에 최소 1회 지속심의* 결과 제출 의무화
- * IRB가 심의하여 승인한 연구계획에 따라 연구가 진행되고 있는지 확인하는 심의
- ○ 인간대상연구 및 인체유래물연구 등 생명윤리법 관련 연구를 수행하는 산하공공기관 및 단체 내에 IRB가 설치·등록 될 수 있도록 홍보
- - IRB 설치가 어려운 기관의 경우 보건복지부 지정 공용IRB*와 협약을 통해 심의가 이루어 질 수 있도록 협조
- * '13년부터 국가생명윤리정책연구원 기관생명윤리위원회를 공용IRB로 지정하여 운영 (협약 관련 세부문의 ☎ 02-737-8910)

생명윤리법 적용 연구 예시

연구	연구 주요내용	연구대상	생명윤리법 적용 여부
휴대폰 전자파 수치 실험	다양한 휴대폰의 전자파 수치를 비교한 실험	휴대폰	미적용
휴대폰 전자파가 미치는 영향 실험(동물실험)	흰쥐를 대상으로 휴대폰 전자파가 흰쥐에 미치는 영향을 분석하여 인체에 미치는 영향을 추론	동물 (흰쥐)	미적용
휴대폰 전자파가 인체에 미치는 영향 실험	연구대상자를 모집하여 휴대폰 전자파가 인체에 미치는 영향 분석	인간 (연구대상자)	적용
휴대폰 전자파가 인체에 미치는 영향 연구	휴대폰 전자파가 인체에 미치는 영향에 대한 기존 임상실험결과를 토대로 한 2차 연구	인간 (개인정보, 임상정보 등)	적용
휴대폰 전자파 수치에 따른 소비자 선호도 조사	대인접촉 등을 통해 수행하나 연구방법을 사용하지 않는 단순 마케팅 조사	인간 (소비자)	미적용
휴대폰 전자파에 대한 국민 인식도 조사연구	불특정 다수에 대해 대인접촉, 설문조사 등을 통해 연구방법을 활용하여 일반화된 지식 도출	인간 (불특정국민)	적용
소득계층별 휴대폰 사용실태와 그에 따른 전자파 수치에 관한 연구	모집단을 선정하여 설문조사, 대인접촉 등을 통해 사용실태를 분석하고, 분석결과를 기 연구된 휴대폰별 전자파 수치와 비교하여 연구	인간 (소득계층별 모집단)	적용
휴대폰 전자파에 장기간 노출된 흰쥐의 유전자 변형 여부 연구	흰쥐를 휴대폰 전자파에 장기간 노출시킨 후 유전자 변형이 발생했는지를 분석하는 연구	동물유래물 (흰쥐유전자)	미적용
휴대폰 전자파에 장기간 노출된 근로자의 유전자 변형 여부 연구	휴대폰 전자파에 장기간 노출된 근로자(연구대상자)를 선정, 직접 혈액 등을 채취하여 유전자를 분석하는 연구	인체유래물 (유전자)	적용

IRB 개념 및 운영

IRB(Institutional Review Board)

- 기관생명윤리위원회(Institutional Review Board, IRB)
  - 연구 시작 전에 연구대상자 보호, 개인정보보호, 연구방법의 적정성 등 연구의 과학적·윤리적 타당성을 심사하기 위해 인간대상연구 및 인체유래물연구 등을 수행하는 교육기관, 연구기관, 의료기관 등에 설치하는 심의기구
- 「생명윤리 및 안전에 관한 법률」전부 개정('13년 2월 시행)
  - 인간대상연구 및 인체유래물연구 등을 수행하는 교육기관, 연구기관, 의료기관 등은 기관생명윤리위원회를 설치·등록하여야 하며, 관련 연구 수행시 연구계획에 대한 심의를 받아야 함
- 기관생명윤리위원회를 설치하지 않을 경우 과태료 최대 500만원, 등록하지 않을 경우 과태료 최대 200만원 부과
- 생명윤리법 관련 연구용역 추진 시 연구용역 수행기관의 IRB 심의결과 제출 의무화
  - 정부 R&D 설명회 및 관련 교육 등 추진 시 IRB 심의 의무화에 대한 홍보 및 교육

기관생명윤리위원회(IRB)의 기능

생명윤리 및 안전에 관한 법률 제10조 3항

1. 다음 각 목에 해당하는 사항의 심의
   - 가. 연구계획서의 윤리적·과학적 타당성
   - 나. 연구대상자등으로부터 적법한 절차에 따라 동의를 받았는지 여부
   - 다. 연구대상자등의 안전에 관한 사항
   - 라. 연구대상자등의 개인정보 보호 대책
   - 마. 그 밖에 기관에서의 생명윤리 및 안전에 관한 사항
2. 해당 기관에서 수행 중인 연구의 진행과정 및 결과에 대한 조사·감독
3. 그 밖에 생명윤리 및 안전을 위한 다음 각 목의 활동
   - 가. 해당 기관의 연구자 및 종사자 교육
   - 나. 취약한 연구대상자등의 보호 대책 수립
   - 다. 연구자를 위한 윤리지침 마련

기관위원회의 구성 및 운영 등

생명윤리 및 안전에 관한 법률 제11조

- ① 기관위원회는 위원장 1명을 포함하여 5명 이상의 위원으로 구성하되, 하나의 성(性)으로만 구성할 수 없으며, 사회적·윤리적 타당성을 평가할 수 있는 경험과 지식을 갖춘 사람 1명 이상과 그 기관에 종사하지 아니하는 사람 1명 이상이 포함되어야 한다.

② 기관위원회의 위원은 제10조제1항 각 호의 기관의 장이 위촉하며, 위원장은 위원 중에서 호선한다.

③ 기관위원회의 심의대상인 연구·개발 또는 이용에 관여하는 위원은 해당 연구·개발 또는 이용과 관련된 심의에 참여하여서는 아니 된다.

④ 제10조제1항 각 호의 기관의 장은 해당 기관에서 수행하는 연구 등에서 생명윤리 또는 안전에 중대한 위해가 발생하거나 발생할 우려가 있는 경우에는 지체 없이 기관위원회를 소집하여 이를 심의하도록 하고, 그 결과를 보건복지부장관에게 보고하여야 한다.

⑤ 제10조제1항 각 호의 기관의 장은 기관위원회가 독립성을 유지할 수 있도록 하여야 하며, 행정적·재정적 지원을 하여야 한다.

⑥ 제10조제1항에 따라 둘 이상의 기관위원회를 설치한 기관은 보건복지부령으로 정하는 바에 따라 해당 기관위원회를 통합하여 운영할 수 있다.

⑦ 제1항부터 제6항까지에서 규정한 사항 외에 기관위원회의 구성 및 운영에 필요한 사항은 보건복지부령으로 정한다.

기관위원회의 구성 및 운영

생명윤리 및 안전에 관한 법률 시행규칙 8조

① 기관위원회의 회의는 다음 각 호의 어느 하나에 해당할 때에 기관위원회의 위원장이 소집한다.

1. 기관의 장이 소집을 요구할 때
2. 기관위원회 재적위원 3분의 1 이상이 소집을 요구할 때
3. 그 밖에 기관위원회 위원장이 필요하다고 인정할 때

② 기관위원회의 회의는 그 기관에 종사하지 아니하는 위원이 1명 이상 출석하여야 하며, 재적위원 과반수의 출석과 출석위원 과반수의 찬성으로 의결한다.

③ 기관위원회는 업무수행을 위하여 필요한 경우에는 관계 전문가를 회의에 출석하게 하여 의견을 들을 수 있다.

④ 기관위원회는 기관위원회의 위원 명단과 위원들의 자격을 적은 문서 및 기관위원회의 회의록을 작성·비치하여야 한다.

⑤ 기관위원회를 설치한 기관의 장은 기관위원회의 업무를 수행하기 위하여 기관위원회 표준운영지침을 마련하여야 한다.

⑥ 그 밖에 기관위원회의 운영 등에 필요한 사항은 기관위원회의 의결을 거쳐 기관위원회의 위원장이 정한다.

IRB 운영

- 규정에 의해 서면으로 된 절차를 따라야 함
- 규제 당국에 의해 점검을 받고 서면으로 된 절차를 가지고 있으며 이것을 따를 의무가 있음
- 결정 사항에 대해 기록하고 적절히 보관해야 함

제출된 연구에 대한 IRB 심사(1)

- IRB의 주요 검토 사항
  - **시험자의 자격(임상시험교육, 의료지식풍부)**
  - 임상시험계획서 검토자료
  - **피험자 동의서**
  - 피험자 보상(해당되는 경우)
  - 광고(해당되는 경우)

생명윤리교육
홈페이지 주소: https:edu.cdc.go.kr 질병관리본부 교육시스템
교육과정: 임상연구개론(국내임상시험관리규정 KGCP 포함), 임상연구설계

동의서 검토

생명윤리 및 안전에 관한 법률

- 제16조(인간대상연구의 동의) ① 인간대상연구자는 인간대상연구를 하기 전에 연구대상자로부터 다음 각 호의 사항이 포함된 서면동의(전자문서를 포함한다. 이하 같다)를 받아야 한다.
- 1. 인간대상연구의 목적
- 2. 연구대상자의 참여 기간, 절차 및 방법
- 3. 연구대상자에게 예상되는 위험 및 이득
- 4. 개인정보 보호에 관한 사항
- 5. 연구 참여에 따른 손실에 대한 보상
- 6. 개인정보 제공에 관한 사항
- 7. 동의의 철회에 관한 사항
- 8. 그 밖에 기관위원회가 필요하다고 인정하는 사항

동의서 예문

승인: 나는 이 동의서를 읽었고 (피험자의 성명)_____는 위에 쓴 연구에 참여하기로 결정하였습니다. 이 연구의 일반적 목적, 해야 할 일, 있을 수 있는 위험성과 불편, 비밀 유지에 대하여 충분히 설명을 들었습니다. 또한 이 동의서 사본 1부를 받았습니다.

20 년 월 일

피험자(생년월일/성명/자필서명/날인): _____

(구두 동의시에는 피험자의 자필 서명 또는 날인은 불필요)

친족보호자(피험자와의 관계/성명/자필서명/날인):_____

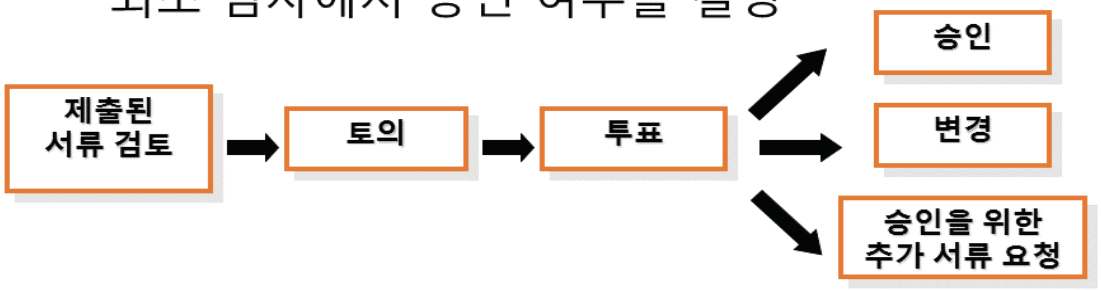
(구두 동의시 친족보호자 대신 증인의 자필 서명 또는 날인을 받고 관계를 증명하는 서류를 첨부)

연구책임자(성명/자필서명/전화 번호):_____

제출된 연구에 대한 IRB 심사(2)

▪IRB 심의

- 최초 심사에서 승인 여부를 결정



서식16

영산대학교 생명윤리위원회 회의록

일 시	. . .	전문위원	분과위원장	위원장
장 소		결재서명	결재서명	결재서명
참석위원	위원장	성명 :		
	분과위원장	성명 :		
	전문위원	성명 :		
	위원	성명 /성명 /성명 /성명 성명 /성명 /성명 /성명		
	의결정족수	재적위원의 수 / 참석위원의 수 : (/) 참석 기관외부 위원의 수 : ( )		
위원 이해상충 확인	*(연구계획서 별로 확인하여 대상위원 기록)*			
전 차수 회의결과 승인 여부	☐ 승인 ☐ 재논의			
정규심의 안건	신규 연구계획서	건		
	지속심의	건		
	보완답변 및 변경	건		
	기 타	건		
연구계획서 심의 내용				
과제번호		연구책임자		
심의종류	정규심의 ☐	신속심의 ☐		
심의결과	승인☐ 수정승인☐ 보완☐ 반려☐ 중지/보류☐ 부결☐	투표결과	찬성( ) /반대( )	
심의 주요내용	1. 전문위원 의견 : 2. 주요 쟁점사항 3. 보완요청 사항과 근거			
지속심의 주기				
(과제추가 시 행 추가)				

서식17-1

연구계획 평가서(인문사회과학연구)

기 본 정 보			
과제번호			
연구과제명			
연구책임자	소 속 :	성 명 :	
심의 종류	☐ 정규심의	☐ 신속심의	
점 검 자			

연구계획서

1) 연구 설계, 시행 및 자료 분석의 측면				
	평가 항목	Yes	No	N/A
1	연구의 목적과 배경이 충분히 기술되어 있는가?	☐	☐	☐
2	선행연구 등의 자료가 잘 제공되고 있는가?	☐	☐	☐
3	연구의 필요성이 기술되어 있는가?	☐	☐	☐
4	연구참여로 인해 연구대상자에게 요구되는 활동의 빈도와 지속 등 구체적인 내용과 설명이 충분하게 포함되어 있는가?	☐	☐	☐
5	연구대상자로부터 얻고자 하는 정보의 범위가 구체적이고 정당성이 있는가?(불필요한 정보 포함여부)	☐	☐	☐
6	연구로 인해 연구대상자로부터 얻어지는 모든 자료(조사, 노트, 녹음, 비디오 녹화 등)의 수집, 기록, 이용, 보관 및 폐기 등에 관한 사항이 구체적으로 기록되어 있는가?	☐	☐	☐
7	연구대상자의 사생활 보호와 관련하여 자료의 보안 등의 대책 마련이 적절한가?	☐	☐	☐
8	연구책임자가 해당연구를 수행하기에 충분할 만큼 적절한 자격을 갖추었는가?	☐	☐	☐

2) 윤리적 측면				
	평가 항목	Yes	No	N/A
1	연구대상자의 선정 및 제외기준이 적절한가?	☐	☐	☐
2	연구 참여 모집절차가 적절하게 기술되어 있는가?	☐	☐	☐
3	취약한 연구대상자를 포함하는 연구의 경우, 그 보호대책이 적절하게 고려되고 있는가?	☐	☐	☐
4	연구참여로 인해 연구대상자에게 발생할 수 있는 위험과 불편이 고려되어 있는가?	☐	☐	☐
5	연구 참여의 자발성이 충분하게 확보되며, 참여 철회 및 중지의 보장 등이 절적하게 고려되고 있는가?	☐	☐	☐

설명문 및 동의서				
	평가 항목	Yes	No	N/A
1	연구목적으로 수행된다는 사실과 연구목적 및 배경이 구체적으로 기술되어 있는가?	☐	☐	☐
2	연구방법 및 절차가 구체적으로 기술되어 있는가?	☐	☐	☐
3	연구대상자의 참여기간 또는 연구대상자로부터 얻어진 정보의 이용기간이 명확하게 기재되어 있는가?	☐	☐	☐
4	연구방법을 통해 얻고자 하는 자료의 범위와 목적이 구체적으로 기술되어 있는가?	☐	☐	☐
5	예상되는 연구대상자의 수가 기술되어 있는가?	☐	☐	☐
6	연구대상자가 준수해야 하는 사항에 대한 설명이 기술되어 있는가?	☐	☐	☐
7	연구 참여로 인해 발생 가능한 위험과 이익이 충분하게 기술되어 있는가?	☐	☐	☐
8	연구로부터 얻어진 연구대상자에 관한 정보가 수집, 기록, 이용, 보관, 폐기되는 방법 및 절차에 대한 설명이 구체적으로 기술되어 있는가?	☐	☐	☐
9	연구로부터 얻어진 연구대상자에 관한 정보가 다른 사람에게 제공되는 경우 이에 대한 구체적인 방법과 절차에 대한 설명이 기술되어 있는가?	☐	☐	☐
10	연구대상자에게 주어지는 경제적 보상이 있다면 그 수준이 적절한가?	☐	☐	☐
11	연구참여가 자발적이라는 사실이 기술되어 있는가?	☐	☐	☐
12	연구대상자가 아무런 불이익이 없이 연구 참여의 철회 또는 중지를 할 수 있다는 내용이 기술되어 있는가?	☐	☐	☐
13	연구대상자의 참여가 중지되거나 철회될 경우 연구대상자의 자료 및 정보에 대한 처리방법이 기술되어 있는가?	☐	☐	☐
14	연구대상자의 개인정보보호를 위한 방법이 구체적으로 설명되어 있는가?	☐	☐	☐
15	연구의 수행과 자료의 신뢰성을 점증하기 위해 모니터링 요원, 점검자, 기관위원회 및 정부 관련 부처장 등이 관련 규정이 정하는 범위 안에서 연구대상자의 비밀보장을 침해하지 않으며 연구대상자의 기록 등을 열람할 수 있다는 사실이 기술되어 있는가?	☐	☐	☐
16	연구대상자가 연구에 대해 문의할 수 있는 연구자의 이름과 연락처 정보가 적절하게 기술되어 있는가?	☐	☐	☐
17	연구대상자의 권리에 대한 정보를 얻고자 하는 경우 문의할 수 있는 연락처(생명윤리위원회)가 기술되어 있는가?	☐	☐	☐
18	연구대상자가 그들의 법적권리를 포기하도록 요구하는 문장이 배제되어 있는가?	☐	☐	☐
19	연구자 또는 연구기관, 의뢰자 또는 의뢰자의 대리인의 의무를 소홀히 한 책임을 면제하거나 이를 암시하는 내용이 없는가?	☐	☐	☐
20	연구자와 관련한 이해상충이 있는 경우 이에 대한 정보를 제공하고 있는가?	☐	☐	☐
21	설명문 및 동의서가 전체적으로 이해하기 쉽게 기술되어 있는가?	☐	☐	☐

서면동의면제 점검 ※ 아래 내용에 모두 'Yes' 표시가 가능하면 서면동의를 면제할 수 있습니다.			
	평가 항목	Yes	No
1	「아동복지법」 제3조에 따른 아동(18세 미만인 사람)이 포함되지 않은 연구입니까?	☐	☐
2	연구대상자의 동의를 받는 것이 연구진행과정에서 현실적으로 불가능하거나 연구결과의 타당성에 심각한 영향을 미치는 연구입니까?	☐	☐
3	연구대상자의 동의거부를 추정할만한 사유가 없고 동의를 면제하여도 연구대상자에게 미치는 위험이 극히 낮은 연구입니까?	☐	☐

검토의견	
평가결론	☐승인 ☐수정승인 ☐보완 ☐반려 ☐중지 · 보류 ☐부결

기관생명윤리위원회(IRB)의 평가

생명윤리 및 안전에 관한 법률 시행규칙 제12조

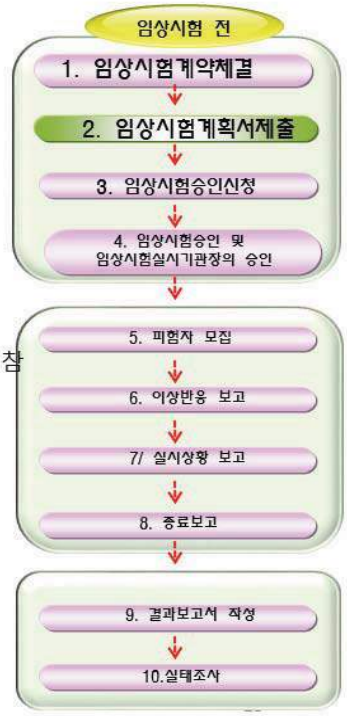
- 제12조(기관위원회의 지원 및 평가 등) ① 법 제13조제1항제3호에서 "보건복지부령으로 정하는 업무"란 다음 각 호의 업무를 말한다.
- 1. 기관위원회의 관련 종사자 교육
- 2. 기관위원회의 표준운영지침 작성 지원
- ② 보건복지부장관은 법 제13조제1항제1호에 따른 기관위원회의 운영실태 등에 대한 조사를 3년마다 할 수 있다.
- ③「생명윤리 및 안전에 관한 법률 시행령」(이하 "영"이라 한다) 제24조제2항제1호에 따라 기관위원회 위원의 교육을 위탁받은 교육기관은 연구의 윤리성, 위원의 역할과 책임, 심의절차와 방법 등에 대하여 교육하여야 한다.
- ④ 제3항에 따른 교육기관은 교육을 한 후 교육실적을 5년간 보관하여야 하며, 보건복지부장관이 요청하면 즉시 제출하여야 한다.

연구진행시 IRB제출서류

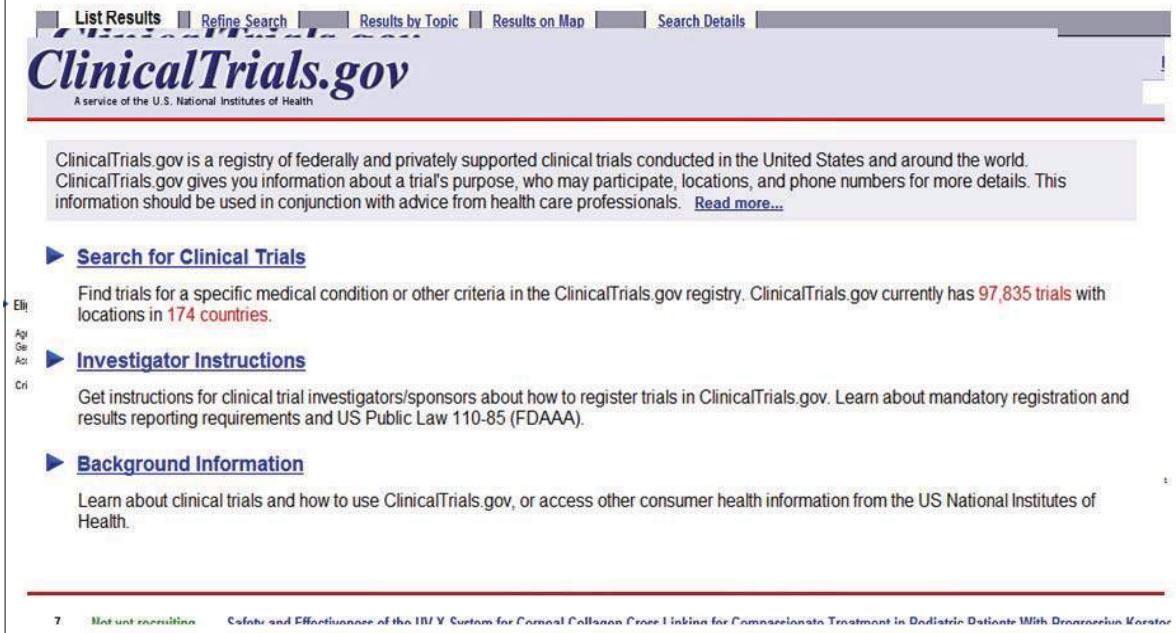
임상시험계획서 제출

•임상시험계획서에 포함되어야 할 사항
(의료기기법시행규칙 제20조)

1. 임상시험의 제목
2. 임상시험기관의 명칭 및 소재지
3. 임상시험의 책임자·담당자 및 공동연구자의 성명 및 직명
4. 임상시험용 의료기기를 관리하는 관리자의 성명 및 직명
5. 임상시험을 하려는 자의 성명 및 주소
6. 임상시험의 목적 및 배경
7. 임상시험용 의료기기의 개요(사용목적, 대상질환 또는 적응증을 포함한다)
8. 임상시험용 의료기기의 적용 대상이 되거나 대조군에 포함되어 임상시험에 참여하는 사람(이하 "피험자"라 한다)의 선정기준·제외기준·인원 및 그 근거
9. 임상시험기간
10. 임상시험방법(사용량·사용방법·사용기간·병용요법 등을 포함한다)
11. 관찰항목·임상검사항목 및 관찰검사방법
12. 예측되는 부작용 및 사용 시 주의사항
13. 중지·탈락 기준
14. 유효성의 평가기준, 평가방법 및 해석방법(통계분석방법에 따른다)
15. 부작용을 포함한 안전성의 평가기준·평가방법 및 보고방법
16. 피험자동의서 서식
17. 피해자 보상에 대한 규약
18. 임상시험 후 피험자의 진료에 관한 사항
19. 피험자의 안전보호에 관한 대책
20. 그 밖에 임상시험을 안전하고 과학적으로 하기 위하여 필요한 사항



Clinicaltrials.gov

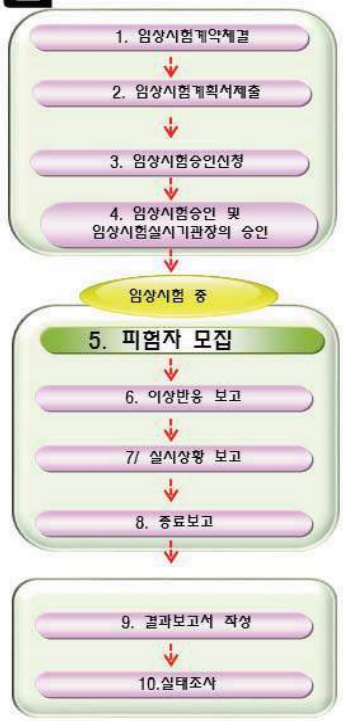


임상시험 실시: 피험자 모집

1. 6. "취약한 환경에 있는 연구대상자 (vulnerable subject)"란 인간대상연구 등의 참여와 관련한 이익에 대한 기대 또는 참여를 거부하는 경우 조직 위계상의 상급자로부터 받게 될 불이익에 대한 우려가 자발적인 참여 결정에 영향을 받을 가능성이 있는 연구대상자, 불치병에 걸린 사람, 집단시설에 수용중인 자, 실업자, 빈곤자, 응급상황에 처한 환자, 소수 인종, 부랑자, 노숙자, 난민, 미성년자, 자유의지에 따른 동의를 할 수 없는 연구대상자등을 말한다.

식품의약품안전평가원 생명윤리 운영규정

피험자 모집 광고 등 활용



이상반응 보고

이상반응(Adverse Event, AE)

- 임상시험중 피험자에게 발생하는 바람직하지 않고 의도되지 않은 징후(sign), 증상(symptom), 질병을 말하며, 해당 임상시험에 사용된 의료기기와 반드시 인과관계가 있어야 하는 것은 아니다.

심각한 이상반응/이상의료기기반응(Serious AE/ADE)

- 사망을 초래하거나 생명을 위협하는 경우
- 입원 또는 입원 기간의 연장이 필요한 경우
- 지속적 또는 의미 있는 불구나 기능 저하를 초래하는 경우
- 선천적 기형 또는 이상을 초래하는 경우

이상반응 보고

6. 이상반응 보고

식약청: 별지 제1호서식

(앞면)

이 상 반 응 보 고 서

보고자	업 허 가 번 호			
	제조(영업)소의 명칭			
	제조(영업)소 소재지			
	성 명		주민등록번호	
대상의료기기	제 품 명		일반명(코드명)	
	허 가 번 호		허 가 일 자	
실 시 기 관	명 칭		전 화 번 호	
	소 재 지			
임상시험(변경)임상시험계획서 승인일자				
이상(의료기기)반응 내역 요약				
비 고				

의료기기임상시험실시기준 제36조제4항 및 제37조제3항의 규정에 따라 위와 같이 임상시험중 발생한 이상반응을 보고합니다.

년 월 일

보 고 자 (서명 또는 인)
담 당 자
전화번호

식품의약품안전청장 귀하

구비서류 - 제36조의 규정에 의하여 시험책임자로부터 보고받은 내용	수수료 없 음

IRB 이상반응 보고

[서식 10]

연구 중 발생한 중대한 이상반응/이상약물반응에 관한 보고서

과 제 번 호		프로토콜 번호	V2.0_15Mar2010		
과 제 명	초기 단계 요추 디스크 회화 치료에 디스크 내rhGDF-5 단회 투여 시 안전성, 내약성 및 예비적인 유효성을 평가하기 위한 다기관, 무작위배정, 이중맹검, 위약 대조 임상시험				
연 구 책 임 자	소속	재활의학과	직급	교수	성명 안 상 호 (인)
보 고 일	년 월 일				
발 생 기 관 및 보 고 종 류	□ 본원	□ 국내 타 기관	■ 국외(호주)		
	■ 초기보고	■ 추적보고			
피 험 자 이 니 셜	BAH	연 령	24 세		
성 별	□ 남 ■ 여	사 망 여 부	□ 예 ■ 아니오		
중 대 한 이 상 반 응 명 칭	UNCONTROLLED PAIN RIGHT SIDED LOWER BACK (CIOMS form 첨부자료 제출참조)				
이 상 반 응 요 약 (상세한 내용은 첨부서류로 제출)	1.ONSET : 06 Jul 2010 2.THERAPY DATES (from/to) : 06-JUL-2010 ~ Stopped 3.No. AU-JNJFOC-20100703347(0), AU-JNJFOC-20100703347 (1) 4. INVOLVED ORPROLONGED INPATIENT HOSPITALIZATION 5. Causality: rhGDF-5 not related. The event was considered related to the protocol procedure.				
피 험 자 보 호 를 위 한 조 치	HOSPITALIZATION				
계 획 서 또 는 동 의 서 에 명 시 되 었 는 지 여 부	Yes				
향 후 연 구 수 행 에 미 치 는 영 향	해당 없음				
제 출 목 적	■ 보고	□ 위원회 심의를 원함			
인 과 관 계	연구자 보고				
	□ 확실함(Certain)	□ 상당히 확실함(Probable/likely)			
	□ 가능함(Possible)	■ 가능성 적음(Unlikely)			
	□ 평가 곤란(Conditional/Unclassified)	□ 평가 불가(Unassessible/unclassifiable)			
		□ 관련 없음(not related)			

※ 중대한 이상반응/중대한 이상약물반응(Serious Adverse Event/Serious Adverse Drug Reaction) 및 예상하지 못한 이상약물반응(Unexpected Adverse Drug Reaction)을 포함함

실시상황 보고

의뢰자->식약청

매년 2월말까지
[별지 제18호서식]

제 목 : 의료기기 임상시험 실시상황보고

의료기기법 제10조 및 동법시행규칙 제13조제2항의 규정에 따라 다음과 같이 임상시험의 실시상황을 보고합니다.

① 임상시험계획의 제목			
② 임상시험계획 승인번호		③승인일자	
④ 제품명(품목명 및 형명)		⑤분류번호(등급)	
⑥ 실시기관 ⑦ 명 칭		⑧전화번호	
⑥ 실시기관 ⑨소 재 지			
⑩ 기관별 참여 피험자 수			
⑪ 기관별 완료 피험자 수			
⑫ 기관별 건년대비 피험자의 중감현황			
⑬ 기관별 완료 예정일			
⑭ 비 고			

의뢰자->IRB

IRB SOP 규정에 따름(일반적으로 1년마다)

지속심의 신청서

[서식 11]

과 제 번 호		프로토콜 번호			
과 제 명					
연 구 기 간	년 월 일 ~ 년 월 일				
연 구 책 임 자	소속	직 급	성 명		(인)
신 청 일	년 월 일				
본원 피험자	목 표 명	등록시 확측 명	스크리닝 실패 명		
	중 도 탈 락 명	추 적 조 사 명			
주 요 항 목	• 직전 지속심의 후 피험자 집단, 피험자 모집 및 선정기준의 변경 여부 □ 없음 □ 있음(내용을 간략히 정부) • 직전 지속심의 후 동의 획득 과정 또는 동의서내용 변경여부 □ 없음 □ 있음(내용을 간략히 정부) • 피험자에 대한 위험-이익 평가에 영향을 줄 수 있는 정보가 발표되거나 유사 연구에서 도출되었는가? □ 없음 □ 있음(내용을 간략히 정부) • 피험자로부터 연구관련 손상으로 인한 손해배상청구 받은 적이 있는가? □ 없음 □ 있음(내용을 간략히 정부) • 연구자가 의뢰자와 지분 및 자문의 관계를 가지게 되어 이해상충관계 발생여부 □ 없음 □ 있음(내용을 간략히 정부) • 참여 연구자 추가 및 탈퇴 여부 □ 없음 □ 있음(내용을 간략히 정부) • 공동연구기관 추가 및 탈퇴여부 □ 없음 □ 있음(내용을 간략히 정부) • 연구진행과정 중에서 누락된 보고 사항이 있었는가? □ 없음 □ 있음(내용을 간략히 정부) • 연구 진행 과정에서 중대한 이상반응이 발생하였는가? □ 없음 □ 있음(본원: 건, 국내: 건, 국외: 건, 전체:건)				

1. 임상시험계약체결
2. 임상시험계획서제출
3. 임상시험승인신청
4. 임상시험승인 및 임상시험실시기관장의 승인

임상시험 중

5. 피험자 모집
6. 이상반응 보고
7. 실시상황 보고
8. 종료보고

9. 결과보고서 작성
10. 실태조사

서식21

중간보고서

기 본 정 보				
과 제 번 호	*(※과제번호는 적지 않습니다. 제출 시 빈칸으로 제출해 주십시오)*			
연 구 과 제 명				
연 구 책 임 자	성 명	소 속	직 위	전공분야

연구 진행 현황		
연구수행기간	연구 예정 기간	생명윤리위원회 승인일 이후 ~ 년 월
	연구 승인 기간	년 월 일 ~ 년 월 일
연구진행상태	☐ 연구대상자 모집 중이지만 아직 등록 전이다. ☐ 연구대상자 등록 중이며 새로운 데이터를 계속 수집 중이다. ☐ 연구대상자 등록을 완료하고 연구가 진행 중이다. ☐ 연구대상자 등록과 연구가 완료된 후 현재 추적조사 중이다. ☐ 기타 ( )	
연구관련 보관서류 목록 (보관 중인 서류를 모두 기재하시기 바랍니다.)	☐ 연구계획서 ☐ 동의서 ☐ 기타 보관서류 ( )	
연구계획서 변경여부	☐ 없음 ☐ 있음(최종 변경승인된 연구계획서 첨부)	
이해상충변동	☐ 없음 ☐ 있음(이해상충공개서 첨부)	
공동연구기관의 추가 또는 탈퇴 여부	☐ 없음 ☐ 있음(해당기관 :)	
참여연구자의 추가 또는 탈퇴 여부	☐ 없음 ☐ 있음(해당연구자 성명:)	
동의획득 과정 또는 동의서 내용	☐ 없음 ☐ 있음(최종 변경승인된 동의서 첨부)	

종료보고

의뢰자->식약청

종료일로부터 20일 이내

의료기기법 제10조 및 동법시행규칙 제13조제2항의 규정에 따라 다음과 같이 임상시험의 종료를 보고합니다.

임상시험계획의 제목			
임상시험계획 승인번호		승 인 일 자	
제 품 명(품목명 및 형명)		분류번호(등급)	
실시기관 명 칭		전 화 번 호	
실시기관 소 재 지			
최초 피험자 선정일 (임상시험 개시일)			
최종 피험자 관찰기간 종료일(임상시험 종료일)			
참여 피험자 수			
예측되지 아니한 중대한 부작용 내역의 요약			
비 고			

의뢰자->IRB

IRB SOP 규정에 따름

종료 보고서

(서식 12)

과 제 번 호			프로토콜 번호				
과 제 명							
보 고 일			연 구 기 간		~		
연구책임자	소 속		직급		성명		(인)
본원 피험자	목 표	명	동의서 취득	명	스크리닝 실패	명	
	중 도 탈 락	명	완 료	명	중대한 이상반응	명	
현재까지의 임상적 연구 결 과							

1. 임상시험계약체결
2. 임상시험계획서제출
3. 임상시험승인신청
4. 임상시험승인 및 임상시험실시기관장의 승인

임상시험 중

5. 피험자 모집
6. 이상반응 보고
7. 실시상황 보고
8. 종료보고

9. 결과보고서 작성
10. 실태조사

결과보고서 작성

임상시험계획서 항목을 바탕으로
계획대비 실시 결과를 작성

결과보고 심의신청서

[서식 13]

과제번호		프로토콜번호				
과 제 명						
심의신청일	년 월 일	연구기간	최초 동의일 년 월 일 부터 최종 방문일 년 월 일 까지			
연구책임자	소속		직급		성명	(인)
본원 피험자	목표 피험자수	명	모집 피험자수	명	완료된 피험자수	명
전체 피험자	목표 피험자수	명	모집 피험자수	명	완료된 피험자수	명
계획서 요약						
연구결과 요 약						
제출서류목록 및 버전번호	※ 아래 작성의 예는 삭제 후 제출하시기 바랍니다. (작성의 예.) 1. 결과보고서 2. 연구비정산서					

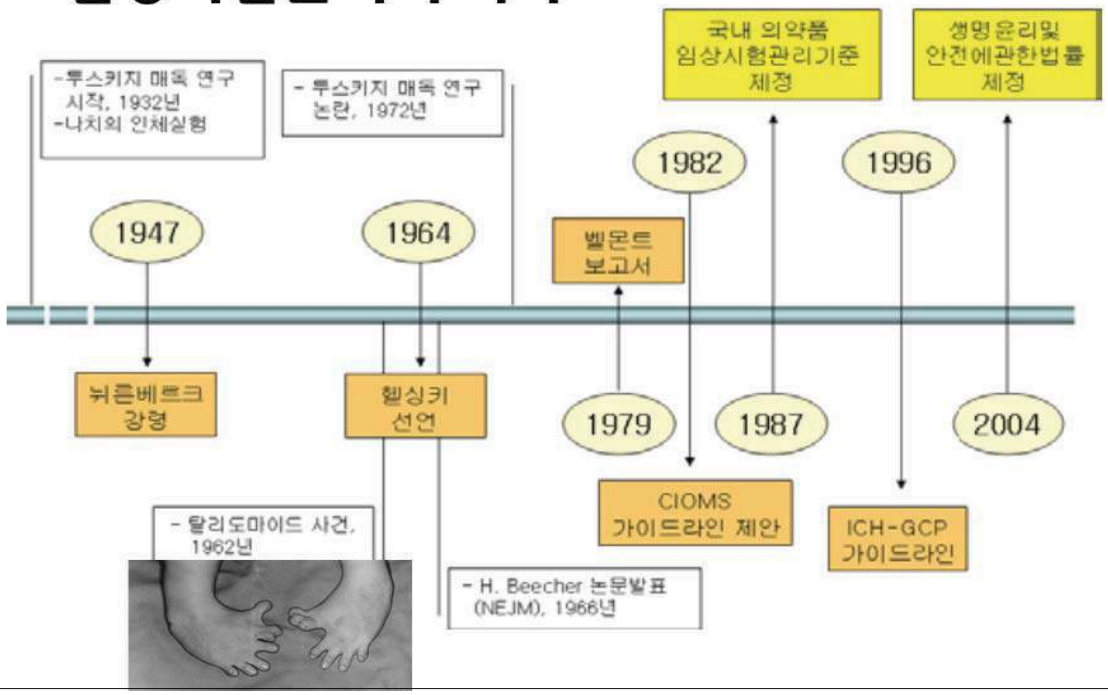
Good Clinical Practice

GCP(Good Clinical Practice)

GCP(Good Clinical Practice)는 사람을 대상으로 하는 임상시험을 설계, 수행, 기록 및 보고하는 데 관한 국제적으로 통용되는 윤리적, 과학적 기준을 뜻한다.

ICH의 GCP 가이드라인은 미국, 유럽, 일본 등에서의 신약개발 및 개발된 의약품의 승인에서 의약품의 품질, 안전성 및 효능을 시험하는 통일된 기준을 마련하기 위해 1996년에 제정된 것으로 총 4가지 카테고리로 구성되어 있으며 이 중 E6가 GCP 관련 사항을 담고 있다.

임상시험윤리의 역사



뉘른베르그 강령 (1947)

- **뉘른베르그 강령 (1947)**
  - 최초의 국제 연구 윤리 지침
  - 허용 가능한 의학 연구의 범위를 정함
  - 피험자(연구 대상자)의 자발적 동의**(voluntary consent)**가 필수적임(essential)을 천명
  - 사회의 이익이 개인의 안전보다 우선시 될 수 없음을 명시
  - 연구자의 자질

헬싱키 선언

- 인류 및 환자의 건강을 증진, 보호할 **의사의 의무**(제2조, 제3조)
- 사람을 대상으로 하는 의학 연구에 있어서 **피험자의 안전 우선** 고려 (제5조 등)
- 윤리 기준에 적합한 의학 연구와 **취약한 피험자 보호**(제8조)
- 연구자는 국제적 요건 뿐 아니라 **자국의 윤리적, 법적 요건과 규제를 숙지**(제9조)
- **연구계획서와 윤리심사위원회**(제13조, 제14조 등)
- **충분한 정보에 근거한 동의**와 피험자 보호(제20조, 제26조 등)
- **치료를 겸한 의학 연구**에 관한 부가 원칙(제28조, 제32조 등)

벨몬트 리포트 B. 연구 윤리 원칙

	기본적 윤리 원칙	연구에 적용
1.	인간 존중의 원칙	충분한 정보에 근거한 동의 (informed consent)
		취약한 피험자 보호 (Protection of vulnerable subject)
2.	선행의 원칙	위험과 이득의 평가 (risk/benefit assessment)
		개인 사생활 및 정보보호
3.	정의의 원칙	공정한 피험자 선택

CIOMS 가이드라인 (1)

- CIOMS (Council for International Organizations of Medical Sciences) : **WHO 산하의 기구**
- CIOMS에서 1982년 인간 피험자 관련 **생명의학 연구에 관한 국제 윤리 가이드라인을 제안**하였으며, 1993년 개정 공포되었고, 2002년 최종 개정안이 발표됨
- 총**21개 가이드라인으로 구성**

CIOMS 가이드라인 (2)

- 주요 내용:
  (1) 사람을 대상으로 하는 생명의학 연구의 윤리적 정당성 및 과학적 유효성에 관한 일반 원칙
  (2) 윤리위원회
  (3) Informed Consent의 획득
  (4) 임상시험 참여의 유인(보상 등)
  (5) 연구 참여의 이익과 위험의 균형 및 위험의 최소화
  (6) 취약한 사람, 어린이, 무능력자, 임산부 등에 대한 특별 조항
  (7) 비밀 보호
  (8) 연구 참여로 인한 손상의 치료와 보상
  (9) 임상시험에 있어 대조군의 선택에 관한 원칙 등이 있음

ICH-GCP (1)

- ICH (International Conference on Harmonization of technical requirements for registration of pharmaceuticals for human use) : 1990년 4월 미국, 유럽연합, 일본의 정부 및 기업이 각 **지역의 의약품 관련 법제를 표준화할 목적으로 시작된 회의**
- ICH-GCP : 1996년 ICP에서 **임상시험관리를 위한 표준 가이드라인** (GCP; Good Clinical Practice)를 제정
- **헬싱키 선언에 근거하여** 피험자의 보호와 임상시험계획의 승인을 목적으로 하는IRB/IEC(Independent Ethics Committee)의 역할에 대한 내용을 담고 있음

ICH-GCP (2)

주요 내용 :

(1) 임상시험은 헬싱키 선언 및 GCP에 따를 것

(2) 임상시험의 이익이 위험을 정당화할 수 있을 것

(3) 피험자의 권리, 안전, 복리는 과학과 사회의 이익 보다 중요하며, 가장 우선적으로 검토될 것

(4) 임상시험은 IRB/IEC의 사전 승인을 받은 계획서에 따라 수행할 것

(5) 피험자의 자발적인 동의서를 받을 것

(6) 임상시험 관련 정보는 기록, 보존될 것

(7) 사생활의 비밀과 개인정보를 보호할 것 등

참고문헌

감사합니다.

논문발표 1

Deducting solutions to problems at the industrial site through deepening curriculum : A study on the improvement of musculoskeletal diseases of physical therapist

/ Gyo-im Kwon

Deducting solutions to problems at the industrial site through deepening curriculum : A study on the improvement of musculoskeletal diseases of physical therapist

Daegu Haany University

Department of Physical Therapy

Kwon-gyoim

INDEX

Introduction

- **Physical Therapist**

✓ provide services that develop

✓ maintain and restore people's maximum movement and functional ability.

✓ ageing, injury, diseases, disorders, conditions or environmental factors.

Introduction

- **musculoskeletal disease**

✓ Working position

✓ working speed

✓ repeat count

✓ Force

✓ personal factors

✓ a functional disorder in which tissue damage continues to accumulate

Introduction

- a physical therapist's cause of musculoskeletal disease

✓ improper posture

✓ excessive force

✓ Repetition

✓ duration of work

Introduction

✓ Work-related pain affects therapists in several personal and professional domains. It also may affect career plans.

☞ Based on the department deepening curriculum, analyze the actual situation survey and results on the environmental factors and postural factors that cause musculoskeletal disorders of the duties of physical therapists, and try to present improvement measures accordingly.

Methods

• Subjects

✓ 2015.07.06~08.16

✓ For the physiotherapy industry worker in Gyeongsangbuk-do, Yeongju city

✓ nervous system (n=30), musculoskeletal system(n=30)

• Procedure

✓ video of physical therapist 's treatment was taken for 30 minutes.

✓ The posture of work was analyzed with 15 cuts at 2 minute intervals.

Methods

OWAS

✓ Ovaco Working Posture Analysing System cord

등	팔	다리																				
		1			2			3			4			5			6			7		
		무게																				
		1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	1	1	1	1	1	1
	2	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	1	1	1	1	1	1
	3	1	1	1	1	1	1	1	1	1	2	2	3	2	2	3	1	1	1	1	1	2
2	1	2	2	3	2	2	3	2	2	3	3	3	3	3	3	3	2	2	2	2	3	3
	2	2	2	3	2	2	3	2	3	3	3	4	4	3	4	4	3	4	4	2	3	4
	3	2	2	4	2	2	3	2	3	3	3	4	4	4	4	4	4	4	4	2	3	4
3	1	1	1	1	1	1	1	1	1	2	3	3	3	4	4	4	1	1	1	1	1	1
	2	2	2	3	1	1	1	1	1	2	4	4	4	4	4	4	3	3	3	1	1	1
	3	2	2	3	1	1	1	2	3	3	4	4	4	4	4	4	4	4	4	1	1	2
4	1	2	3	3	2	2	3	2	2	3	4	4	4	4	4	4	4	4	4	2	3	4
	2	3	3	4	2	3	4	3	3	4	4	4	4	4	4	4	4	4	4	2	3	4
	3	4	4	4	2	3	4	3	3	4	4	4	4	4	4	4	4	4	4	2	3	4

✓ OWAS Action Level

위험 수준	평가 내용
Level 1 (acceptable)	작업 자세에 아무런 조치도 필요 없는 정상 작업 자세
Level 2 (slightly harmful)	지속적인 관심을 가지고 장기적으로 개선이 필요함
Level 3 (distinctly harmful)	작업 자세의 교정이 필요함
Level 4 (extremely harmful)	즉각적인 작업 자세의 교정이 필요함

Methods

REBA

✓ Rapid Entire Body Assessment cord

Table A and 하중

Table A

몸통	1				2				3			
다리	1	2	3	4	1	2	3	4	1	2	3	4
1	1	2	3	4	1	2	3	4	3	3	5	6
2	2	3	4	5	3	4	5	6	4	5	6	7
3	3	4	5	6	4	5	6	7	5	6	7	8
4	4	5	6	7	5	6	7	8	6	7	8	9
⑤	4	6	7	8	6	7	⑧	9	7	8	9	9

하중 / 힘

⓪	1	2	+1
< 5 kg	5–10 kg	> 10 kg	쇼크 또는 힘의 갑작스런 증가

✓ Rapid Entire Body Assessment score

Table C and Activity Score

Table C

Score B

Score A	1	2	3	4	⑤	6	7	8	9	10	11	12
1	1	1	1	2	3	3	4	5	6	7	7	7
2	1	2	2	3	4	4	5	6	7	7	8	8
3	2	3	3	4	5	5	6	7	8	8	8	9
4	3	4	4	5	6	6	7	8	9	9	9	9
5	4	4	4	5	6	7	8	8	9	10	10	10
6	6	6	6	7	8	8	9	9	10	10	11	11
⓪	7	8	8	9	⑩	10	10	10	10	11	11	11
8	9	9	9	10	10	10	11	11	11	12	12	12
9	10	10	10	11	11	11	11	12	12	12	12	12
10	11	11	11	11	12	12	12	12	12	12	12	12
11	11	12	12	12	12	12	12	12	12	12	12	12
12	12	12	12	12	12	12	12	12	12	12	12	12

Activity score

- +1 • 한 곳 이상의 신체 부위가 정적임 (예, 1분 이상 같은 자세 유지)
- +1 • 작은 범위의 동작의 반복 (예, 분당 4회 이상의 반복 동작 (단, 걷기는 예외))
- (+1) • 갑작스럽게 큰 범위의 자세의 변화를 일으키거나 무게 중심을 잘 유지할 수 없는 동작

∴ REBA 점수 = 10 (Table C) + 1 (Activity score) = 11

Methods

REBA

✓ REBA Action Level

조치단계	REBA점수	위험단계	조치(추가정보조사 포함)
0	1	무시해도 좋음	필요 없음
1	2~3	낮음	필요한 지도 모름
2	4~7	보통	필요함
3	8~10	높음	곧 필요함
4	11~15	매우 높음	즉시 필요함

Methods

Analysis method

- ✓ SPSS ver 19.0
- ✓ General characteristics of the subjects and prevalence and distribution by body part were presented as mean and standard deviation (SD) using descriptive statistics.
- ✓ OWAS and REBA was used to compare differences before and after the improvement plan was used for paired t-test.
- ✓ significance was set at .05.

Result

Table 3. General characteristics of the subjects

(N=60)

	nervous system (n=30)	musculoskeletal system(n=30)
age(years)	27.766±5.946§	25.833±5.363
sex(M/F)	1.400±0.498	1.533±0.507
A day shift(hour)	8.000±0.000	8.433±0.504
Service period(month)	64.066±61.920	41.200±39.687

§mean±SD

Result

Table 4. nervous system prevalence and distribution by body part

통증부위		목		어깨		팔/팔꿈치		손부위		허리		다리/발	
		N	%	N	%	N	%	N	%	N	%	N	%
유병률(n=30)		16	53.3	25	83.3	13	43.3	16	53.3	23	76.7	10	33.3
통증부위	오른쪽			9	30.0	9	30.0	6	20.0			6	20.0
	왼쪽			5	16.7	3	10.0	2	6.7			2	6.7
	양쪽 모두			11	36.7	1	3.3	7	23.3			3	10.0
지속기간	1일미만	2	6.7	4	13.3	7	23.3	5	16.7	1	3.3	4	13.3
	1일~1주일	0	0	5	16.7	2	6.7	8	26.7	11	36.7	3	10.0
	1주일~한달	5	16.7	3	10.0	2	6.7	2	6.7	7	23.3	0	0
	한달~6개월	5	16.7	6	20.0	1	3.3	0	0	2	6.7	1	3.3
	6개월 이상	4	13.3	7	23.3	1	3.3	1	3.3	1	3.3	2	6.7
통증 정도	약한 통증	3	10.0	4	13.3	8	26.7	7	23.3	6	20.0	7	23.3
	중간 통증	9	30.0	8	26.7	4	13.3	9	30.0	15	50.0	3	10.0
	심한 통증	3	10.0	10	33.3	1	3.3	0	0	2	6.7	0	0
	매우심한통증	1	3.3	3	10.0	0	0	0	0	0	0	0	0
발생 주기	6개월에 한번	1	3.3	0	0	3	10.0	5	16.7	1	3.3	3	10.0
	2~3달에 한번	4	13.3	7	23.3	6	20.0	4	13.3	5	16.7	1	3.3
	한달에 한번	2	6.7	2	6.7	2	6.7	2	6.7	9	30.0	4	13.3
	일주일에 한번	4	13.3	7	23.3	2	6.7	3	10.0	5	16.7	2	6.7
	매일	5	16.7	9	30.0	0	0	2	6.7	3	10.0	0	0
최근 경험	예	2	6.7	3	10.0	6	20.0	9	30.0	8	26.7	6	20.0
	아니오	14	46.7	22	73.3	7	23.3	7	23.3	15	50.0	4	13.3
대처	병원, 한의원	5	16.7	9	30.0	2	6.7	1	3.3	5	16.7	0	0
	약국 치료	0	0	2	6.7	1	3.3	2	6.7	2	6.7	1	3.3
	병가, 산재	0	0	0	0	0	0	0	0	0	0	0	0
	작업 전환	1	3.3	3	10.0	0	0	1	3.3	2	6.7	0	0
	해당사항 없음	10	33.3	11	36.7	10	33.3	12	40.0	14	46.7	1	3.3
	기타	0	0	0	0	0	0	0	0	0	0	8	26.7

Result

Table 5. musculoskeletal system prevalence and distribution by body part

통증부위		목		어깨		팔/팔꿈치		손부위		허리		다리/발	
		N	%	N	%	N	%	N	%	N	%	N	%
유병률(n=30)		13	43.3	18	60.0	7	23.3	10	33.3	23	76.7	6	20.0
통증부위	오른쪽			8	26.7	5	16.7	5	16.7			5	16.7
	왼쪽			2	6.7	1	3.3	1	3.3			1	3.3
	양쪽 모두			8	26.7	1	3.3	4	13.3			0	0
지속기간	1일미만	4	13.3	2	6.7	2	6.7	1	3.3	3	10.0	2	6.7
	1일~1주일	1	3.3	4	13.3	1	3.3	5	16.7	13	43.3	1	3.3
	1주일~한달	4	13.3	4	13.3	2	6.7	3	10.0	5	16.7	2	6.7
	한달~6개월	3	10.0	3	10.0	1	3.3	0	0	1	3.3	0	0
	6개월 이상	1	3.3	5	16.7	1	3.3	1	3.3	1	3.3	1	3.3
통증 정도	약한 통증	4	13.3	2	6.7	3	10.0	4	13.3	6	20.0	3	10.0
	중간 통증	7	23.3	10	33.3	3	10.0	5	16.7	11	36.7	2	6.7
	심한 통증	2	6.7	4	13.3	1	3.3	1	3.3	6	20.0	1	3.3
	매우심한통증	0	0	2	6.7	0	0	0	0	0	0	0	0
발생 주기	6개월에 한번	1	3.3	0	0	2	6.7	2	6.7	4	13.3	3	10.0
	2~3달에 한번	2	6.7	5	16.7	3	10.0	4	13.3	4	13.3	2	6.7
	한달에 한번	6	20.0	5	16.7	2	6.7	1	3.3	6	20.0	1	3.3
	일주일에 한번	2	6.7	3	10.0	0	0	2	6.7	7	23.3	0	0
	매일	2	6.7	5	16.7	0	0	1	3.3	2	6.7	0	0
최근 경험	예	5	16.7	3	10.0	4	13.3	3	10.0	5	16.7	3	10.0
	아니오	8	26.7	15	50.0	3	10.0	7	23.3	18	60.0	3	10.0
대처	병원, 한의원	1	3.3	2	6.7	2	6.7	2	6.7	2	6.7	0	0
	약국 치료	1	3.3	3	10.0	0	0	1	3.3	4	13.3	0	0
	병가, 산재	0	0	0	0	0	0	0	0	0	0	0	0
	작업 전환	1	3.3	1	3.3	0	0	0	0	1	3.3	0	0
	해당사항 없음	10	33.3	12	40.0	5	16.7	7	23.3	16	53.3	6	20.0
	기타	0	0	0	0	0	0	0	0	0	0	0	0

Result

Table 6. Working posture distribution by OWAS evaluation criteria

	nervous system (n=30)	musculoskeletal system(n=30)
Body		
pre-test	3.300±0.836§	2.266±0.691
post-test	1.600±0.932	1.933±1.142
p	0.000	0.194
Arm		
pre-test	1.466±0.730	1.000±0.000
post-test	1.200±0.550	1.200±0.550
p	0.088	0.056
Legs		
pre-test	4.800±1.126	4.933±1.779
post-test	3.200±2.510	2.900±2.279
p	0.008	0.001
Weight		
pre-test	1.833±0.746	1.733±0.639
post-test	1.466±0.628	1.533±0.628
p	0.014	0.264
Action		
pre-test	3.800±0.484	3.033±0.490
post-test	1.266±0.449	1.333±0.479
p	0.000	0.000

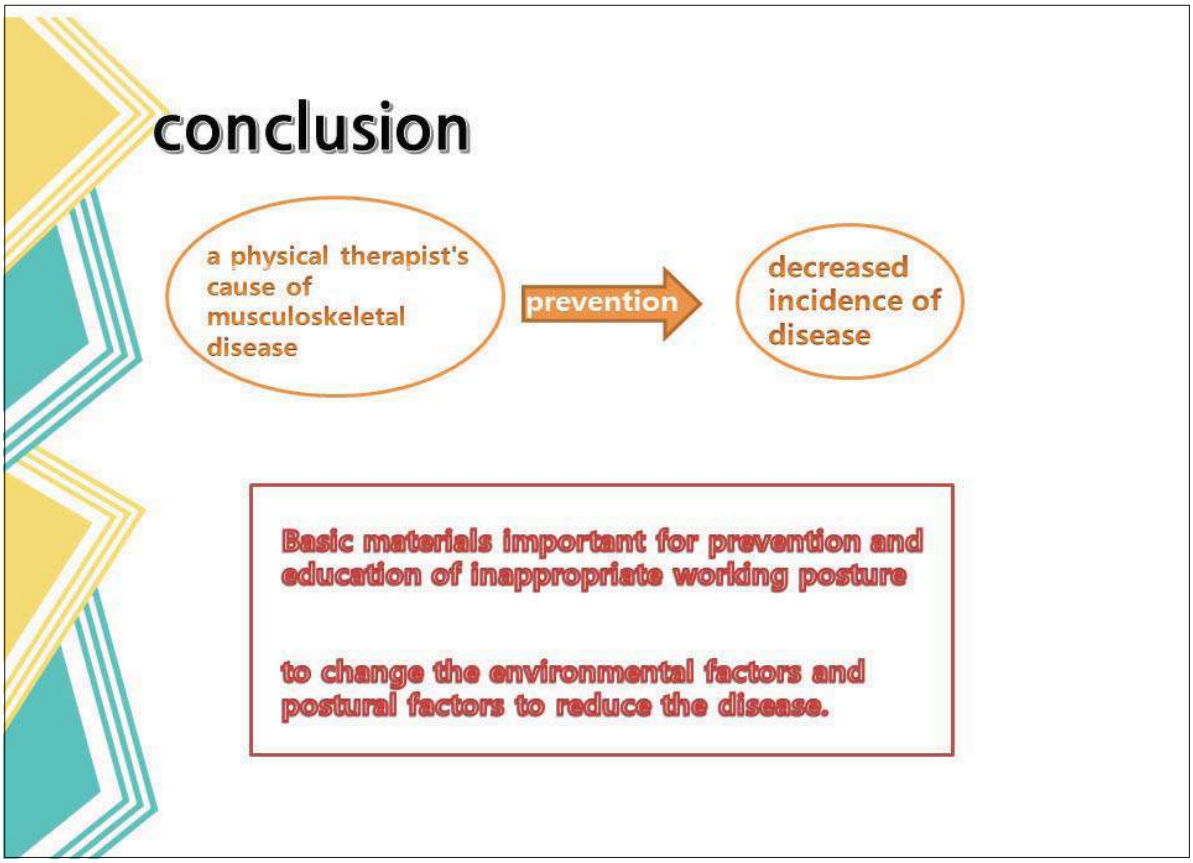
§mean±SD
Action : to determine the level of action to be taken by analyzing the code number of the working p osture

Result

Table 7. Working posture distribution by REBA evaluation criteria

	nervous system (n=30)	musculoskeletal system(n=30)
A score		
pre-test	8.066±1.284§	5.600±1.958
post-test	3.000±1.893	1.900±0.884
p	0.000	0.000
B score		
pre-test	4.033±1.884	4.000±1.485
post-test	2.566±1.250	2.300±1.317
p	0.004	0.000
C score		
pre-test	8.833±1.440	6.366±1.884
post-test	3.033±2.025	1.933±0.944
p	0.000	0.000
Totatl score		
pre-test	9.833±1.440	9.333±1.604
post-test	3.333±2.202	2.100±1.124
p	0.000	0.000
Action		
pre-test	3.400±0.498	3.133±0.434
post-test	1.166±0.874	0.766±0.678
p	0.000	0.000

§mean±SD
A score : (body+arm+legs)+weight/force
B score : (shoulder+elbow+wrist)+Coupling
C score : total score+action
Total score : A+B
Action : to determine the level of action to be taken by analyzing the code number of the working posture

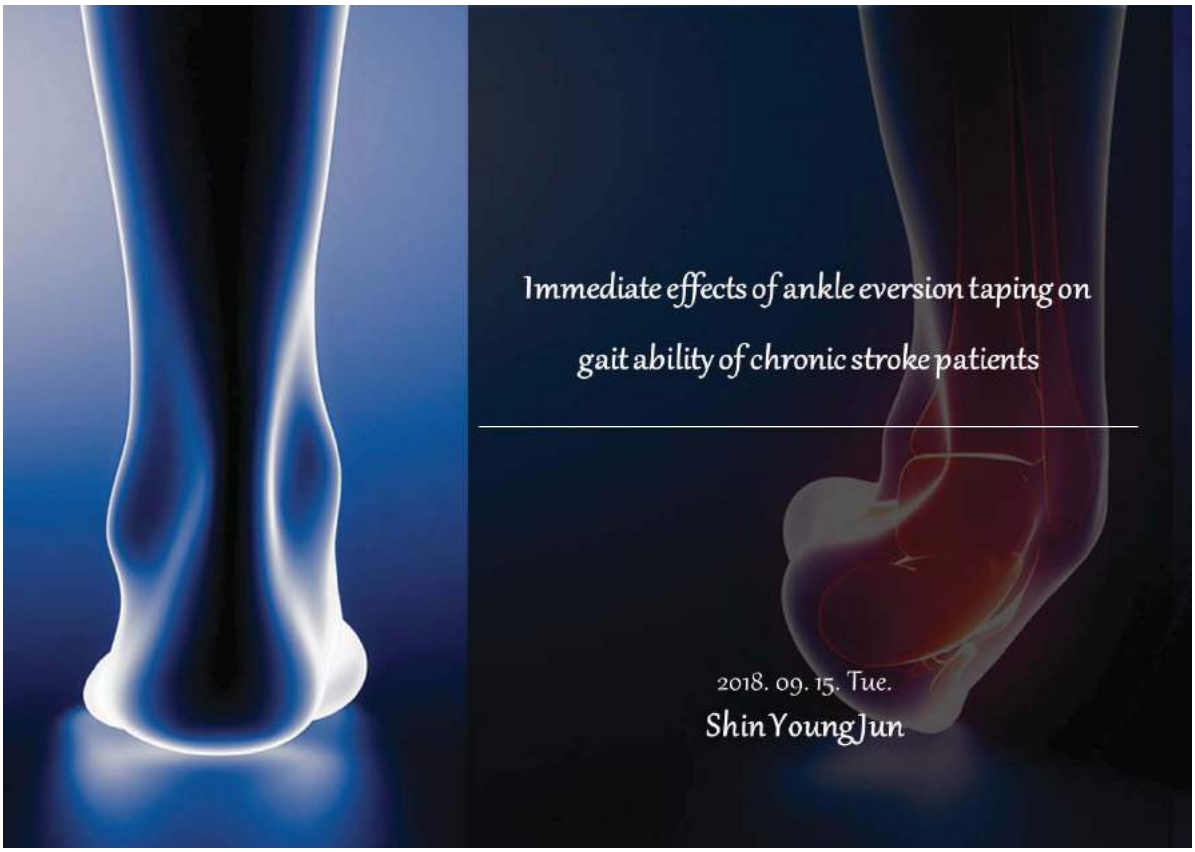

conclusion
a physical therapist's cause of musculoskeletal disease
prevention
decreased incidence of disease
Basic materials important for prevention and education of inappropriate working posture
to change the environmental factors and postural factors to reduce the disease.


Thank you !

논문발표 2

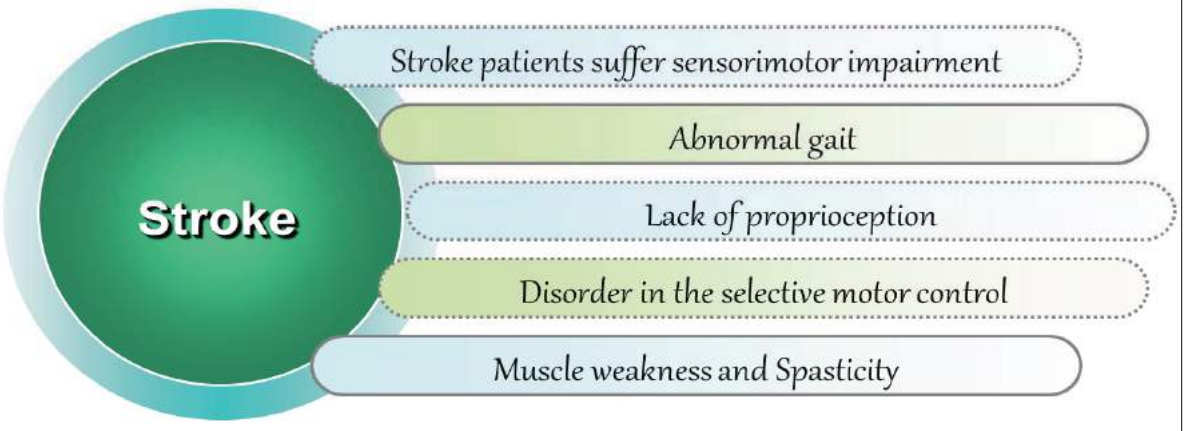
Immediate effects of ankle eversion taping on gait ability of chronic stroke patients

/ Young-jun Shin

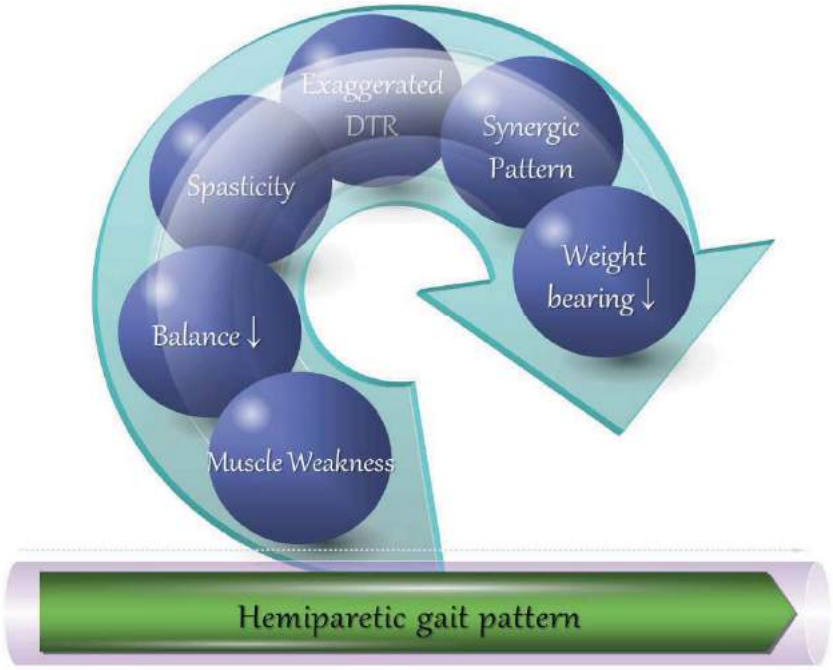


CONTENTS

INTRODUCTION



Symptoms



Foot Drop

- stiffness of plantar flexors
- weakness of dorsi flexors
- increased spasticity

Treatment

AFO

- Commonest treatment
- Provide stability of the paretic limb
- Supports dorsiflexion of the ankle

maintaining a neutral ankle position

FES

- Frequently used
- Activates the dorsi flexor
- Stimulating the common peroneal nerve

method to correct foot drop

However, FES and AFO are expensive, uncomfortable to carry, and aesthetically unattractive. AFO can correct foot drop, but if patients wear an AFO for a long time, it can produce negative effects such as ankle contracture and limitation of mobility.

Kinesiology taping

- **Kim et al.** — muscle facilitation, gait ability, and balance function were improved after application of kinesiology taping on the tibialis anterior in patients with stroke.
- **Bae et al.** — static balance was improved in stroke patients with foot drop when applying lower-leg kinesiology taping.
- **Lee et al.** — pelvic angle and musculoskeletal diseases around lower lumbar was decreased after Anterior Pelvic Tilt Taping which is mechanical taping method in office worker with slump sitting
- **Lee et al.** — proved that Posterior Pelvic Tilt Taping decreased pelvic angle and sacral horizontal angle and have a positive effect on medical buttock pain

Purpose

this study is to assess the immediate effects of applying ankle eversion taping using kinesiology tape in patients with foot drop after stroke. And this study compared and analyzed ankle eversion taping, placebo taping, and no taping to prove the effects of ankle eversion taping.

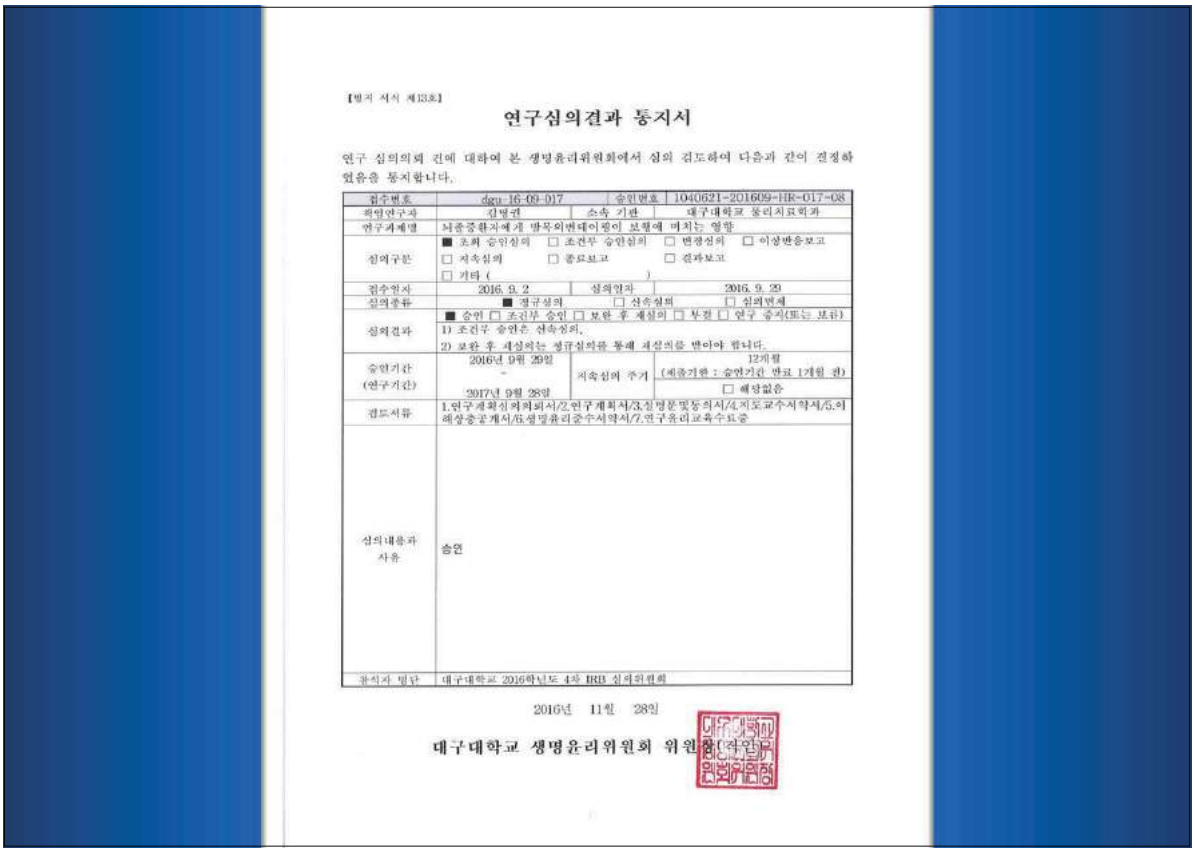
METHODS

Participants

- Twenty-one subjects were recruited from Dalgubul rehabilitation.
- Six failed to meet inclusion criteria due to refusal to participate and not meeting inclusion criteria.

- Fifteen subjects met the inclusion criteria for the study.
- All subjects provided informed, written consent prior to enrollment in in the study.

- Approval from the Research Ethics Committee of Deagu University (1040621-201609-HR-017-08).



【별지 서식 제13호】

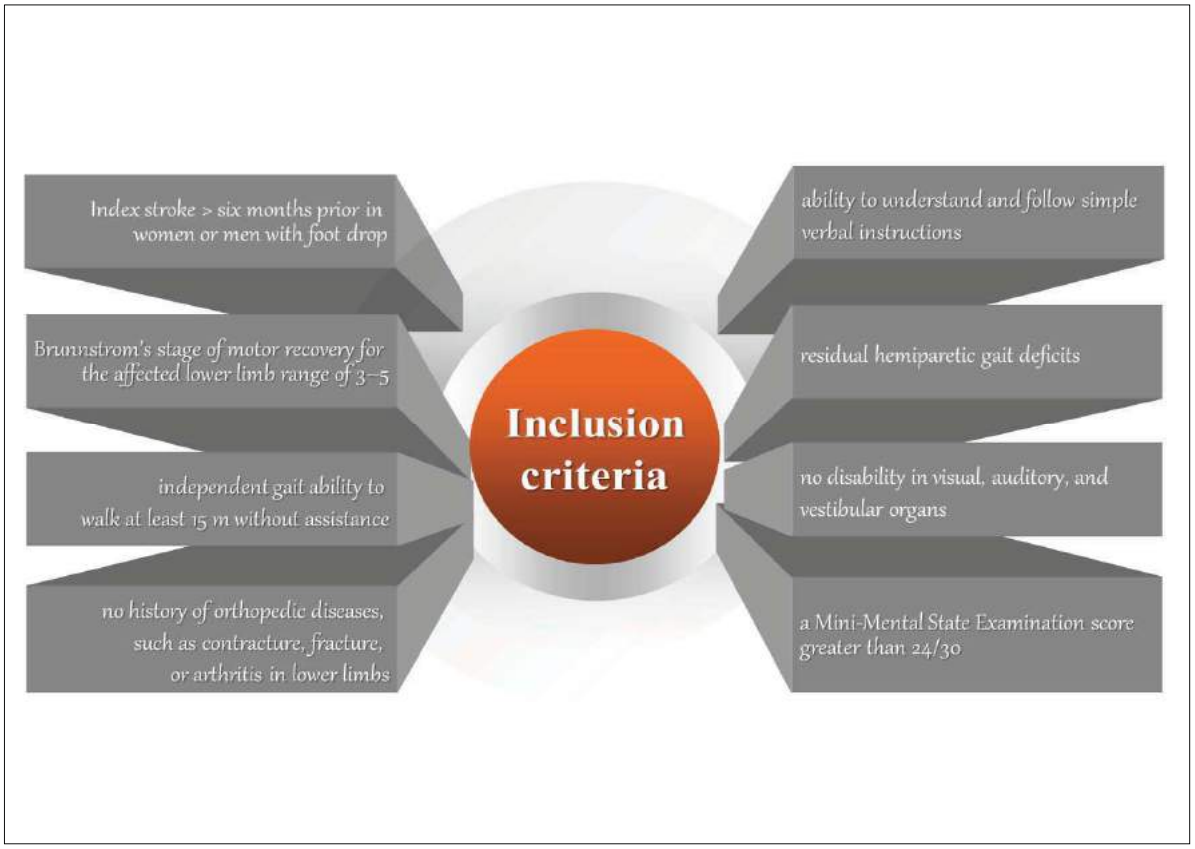
연구심의결과 통지서

연구 심의의뢰 건에 대하여 본 생명윤리위원회에서 심의 검토하여 다음과 같이 결정하였음을 통지합니다.

접수번호	dgu-16-09-017	승인번호	1040621-201609-HR-017-08
책임연구자	김명권	소속 기관	대구대학교 물리치료학과
연구과제명	뇌졸중환자에게 맹목외번테이핑이 보행에 미치는 영향		
심의구분	■ 초회 승인심의 □ 조건부 승인심의 □ 변경심의 □ 이상반응보고 □ 지속심의 □ 종료보고 □ 결과보고 □ 기타 ( )		
접수일자	2016. 9. 2	심의일자	2016. 9. 29
심의종류	■ 정규심의	□ 신속심의	□ 심의면제
심의결과	■ 승인 □ 조건부 승인 □ 보완 후 재심의 □ 부결 □ 연구 중지(또는 보류) 1) 조건부 승인은 신속심의, 2) 보완 후 재심의는 정규심의를 통해 재심의를 받아야 합니다.		
승인기간 (연구기간)	2016년 9월 29일 ~ 2017년 9월 28일	지속심의 주기	12개월 (예종기한 : 승인기간 만료 1개월 전) □ 해당없음
검토서류	1.연구계획심의의뢰서/2.연구계획서/3.설명문및동의서/4.지도교수서약서/5.이해상충공개서/6.설명윤리준수서약서/7.연구윤리교육수료증		
심의내용과 사유	승인		
심의자 명단	대구대학교 2016학년도 4차 IRB 심의위원회		

2016년 11월 28일

대구대학교 생명윤리위원회 위원장 (직인)



Intervention

Ankle Eversion Taping

- The first stage is posterior talar gliding taping, which is to increase the dorsiflexion of the ankle.
- This taping sets the patient's ankle in a slightly dorsiflexed state and begins from the front part of talus, passes through both sides of malleolus and wraps up calcaneus.

Intervention

Ankle Eversion Taping

- The third stage is eversion taping for the eversion of ankle.
- It sets the patient's ankle in a slightly eversed state and begins from 5cm above the outer malleolus, passes around the back side, down the inner malleolus, and wraps up the sole from the inside to outside.

Intervention

Ankle Eversion Taping

- The third stage is eversion taping for the eversion of ankle.
- This stage applies the Kinesiology tape twice, with approximately 50% overlapping.

Intervention

Placego Taping

- The first stage begins from the inner malleolus, and it is applied up to the inner middle point of the pelvic limb.
- The second stage begins from the outer malleolus up to the outer middle point of the pelvic limb.

Outcome measure

Gaitrite

- The assessment was performed using the GAITRite portable walkway system ('Platinum model, CIR Systems Inc., Clifton, NJ, USA), which records the location and timing of each footfall during ambulation.
- The GaitRite system is an electronic walkway utilized to measure the temporal and spatial parameters of gait.
- The measured walking variables are Gait velocity(m/s), step length(cm), stride length(cm) and H-H base support(cm).

Statistical analysis

Statistical analysis was performed using SPSS version 18.0.

Subject general characteristics were analyzed using descriptive statistics and results are reported as means and standard deviations.

One-way repeated ANOVA was used for the group analysis, and the post-hoc Tukey test was used to determine the significances of results, which were accepted for p values of < 0.05.

RESULTS

- The characteristics of the study subjects before and after each intervention are shown in Table 2. All subject did not have skin redness on taping and there were no side effects.
- Velocity, step length, stride length and cadence under the ankle eversion taping conditions significantly increased (p<0.05) compared to the placebo and no taping conditions (Table 2, Fig.4).

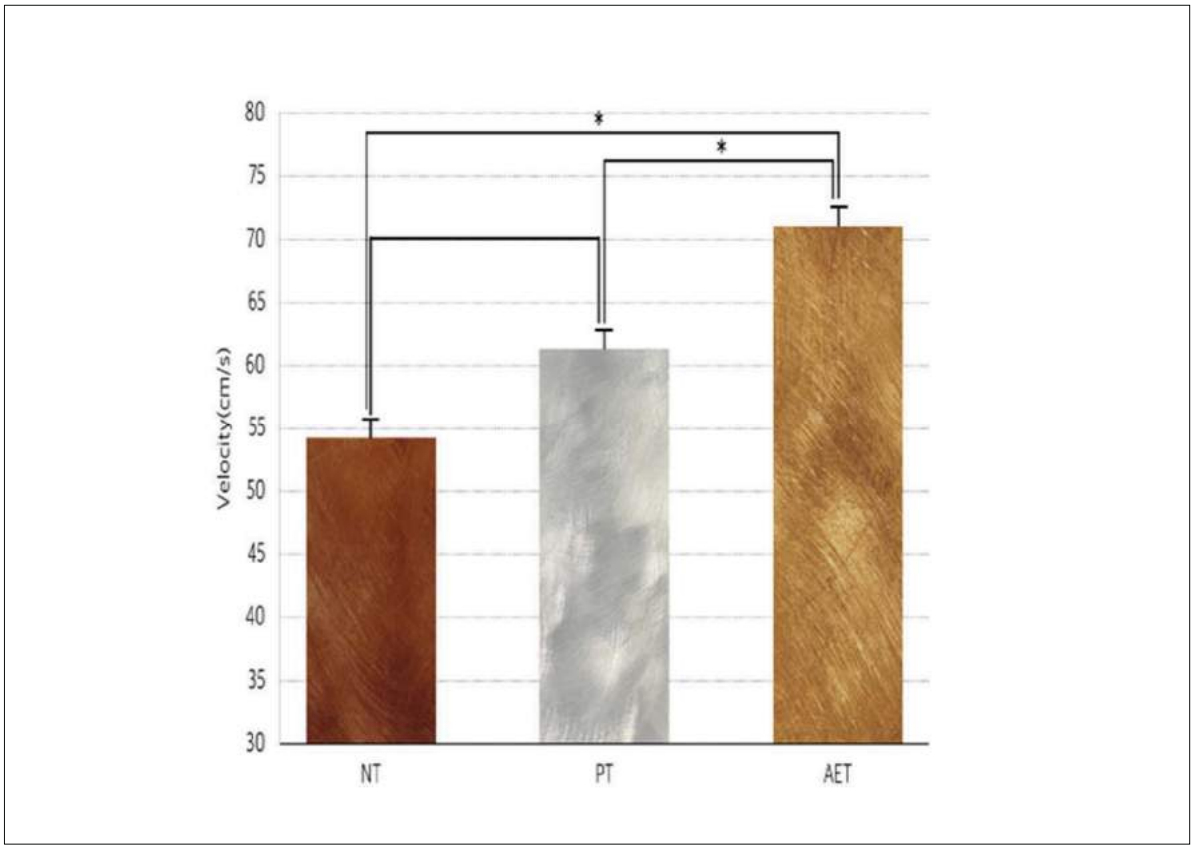
Table 1. General characteristics of the subjects (n =15)

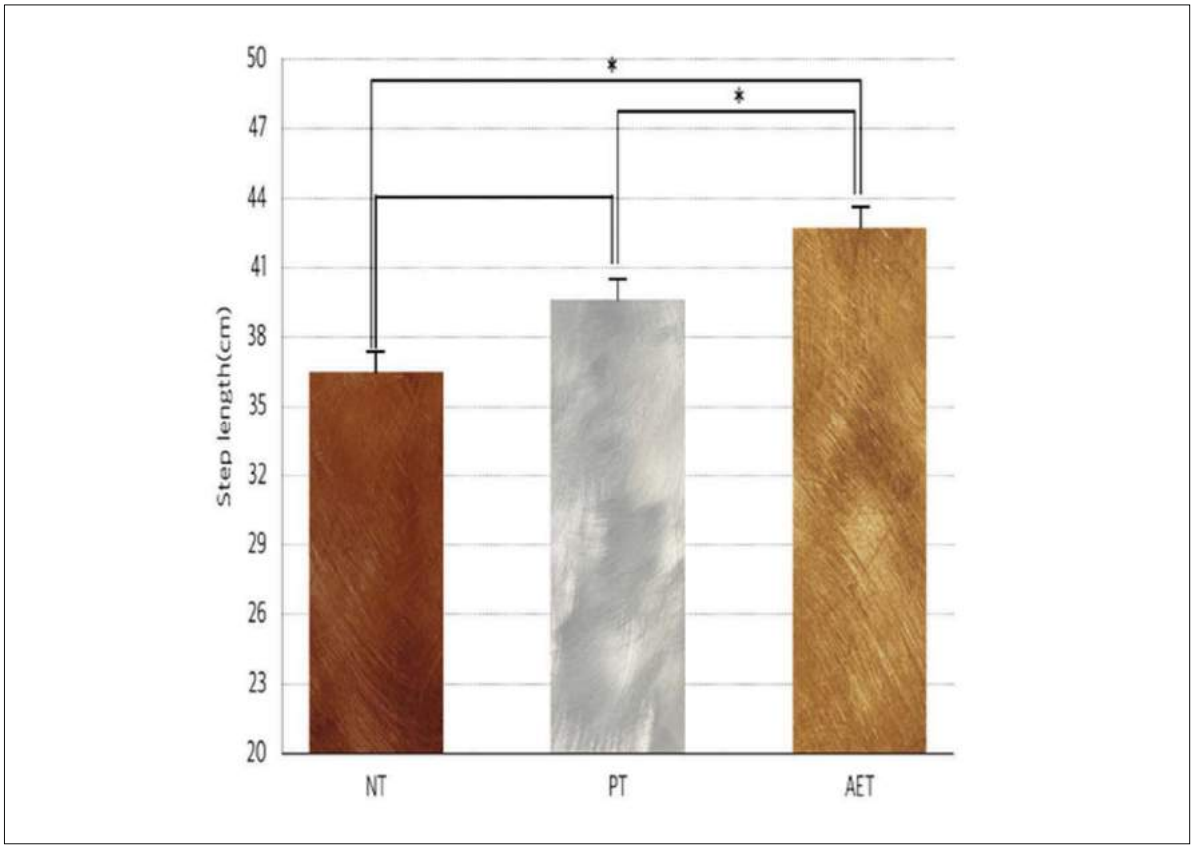
Variable	Mean± SD
Age (year)	62.93±6.28
Height (cm)	164.27±10.71
Weight (kg)	63.00±14.68
Sex (male/female)	8/7
Hemorrhage / Ischemic	4/11
Brunnstrom's stage(3/4/5)	3/8/4
Mini-Mental State Examination score	26.66±0.81
Time since onset (year)	7.77±1.89

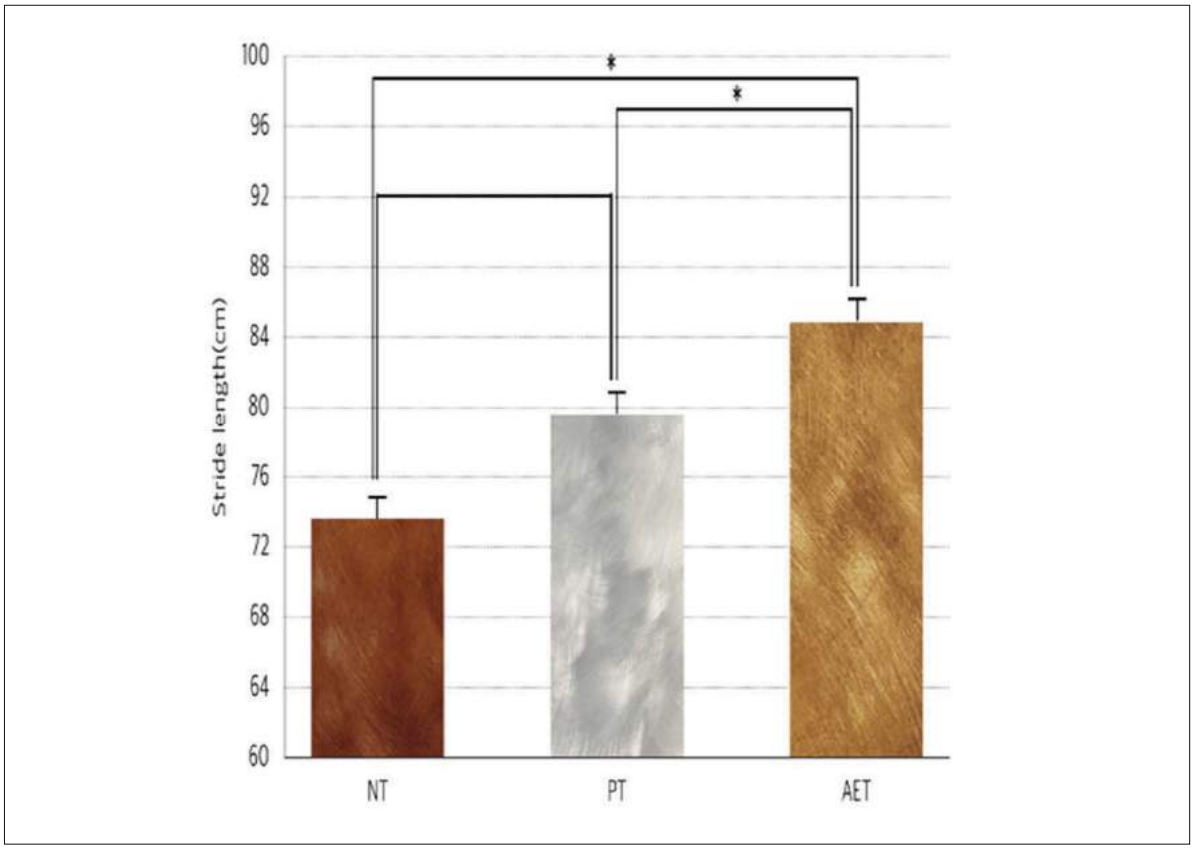
SD, standard deviation

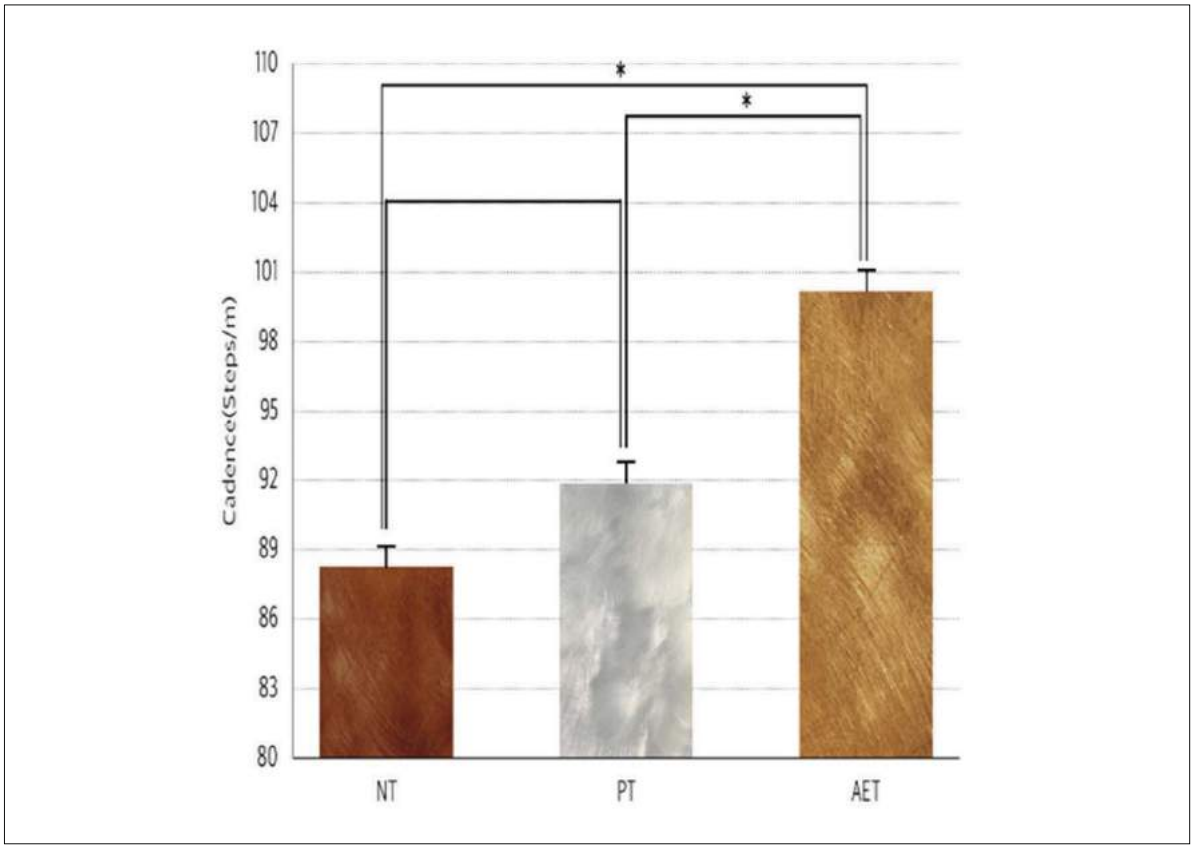
Table 2. Comparison of the velocity, step length, stride length, Cadence and H-H base support among the three condition (n= 15)

	Mean ± SD			F	*p*
	No Taping	Placebo Taping	Ankle Eversion Taping		
Velocity (cm/s)	54.27±18.35	61.33±18.25	71.03±21.89	16.590	0.000
Step Length (cm)	36.52±7.15	39.63±8.27	42.17±8.66	16.264	0.000
Stride Length (cm)	73.62±14.24	79.59±16.51	84.83±17.35	15.658	0.000
Cadence (steps/m)	88.27±18.35	91.86±14.81	100.19±16.92	10.340	0.000


80
75
70
65
60
55
50
45
40
35
30
Velocity(cm/s)
*
*
NT
PT
AET

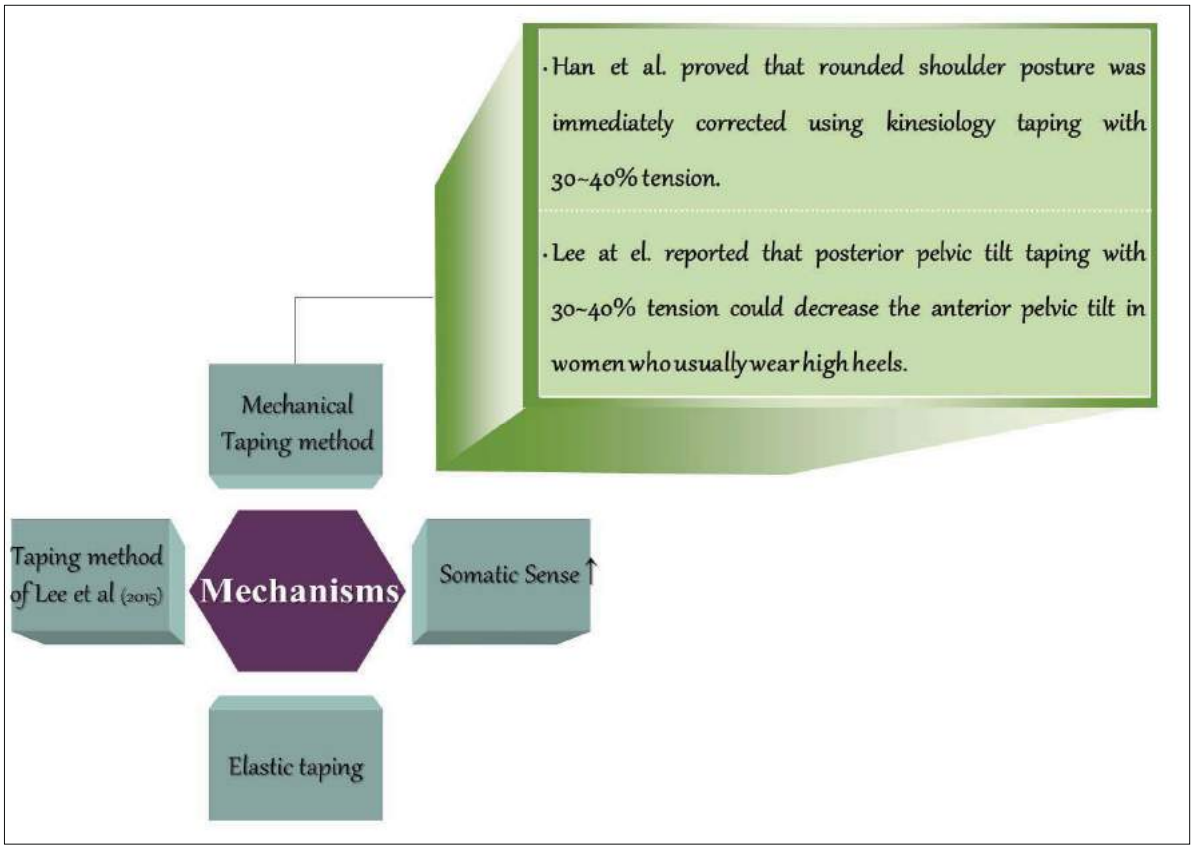

50
47
44
41
38
35
32
29
26
23
20
Step length(cm)
*
*
NT
PT
AET

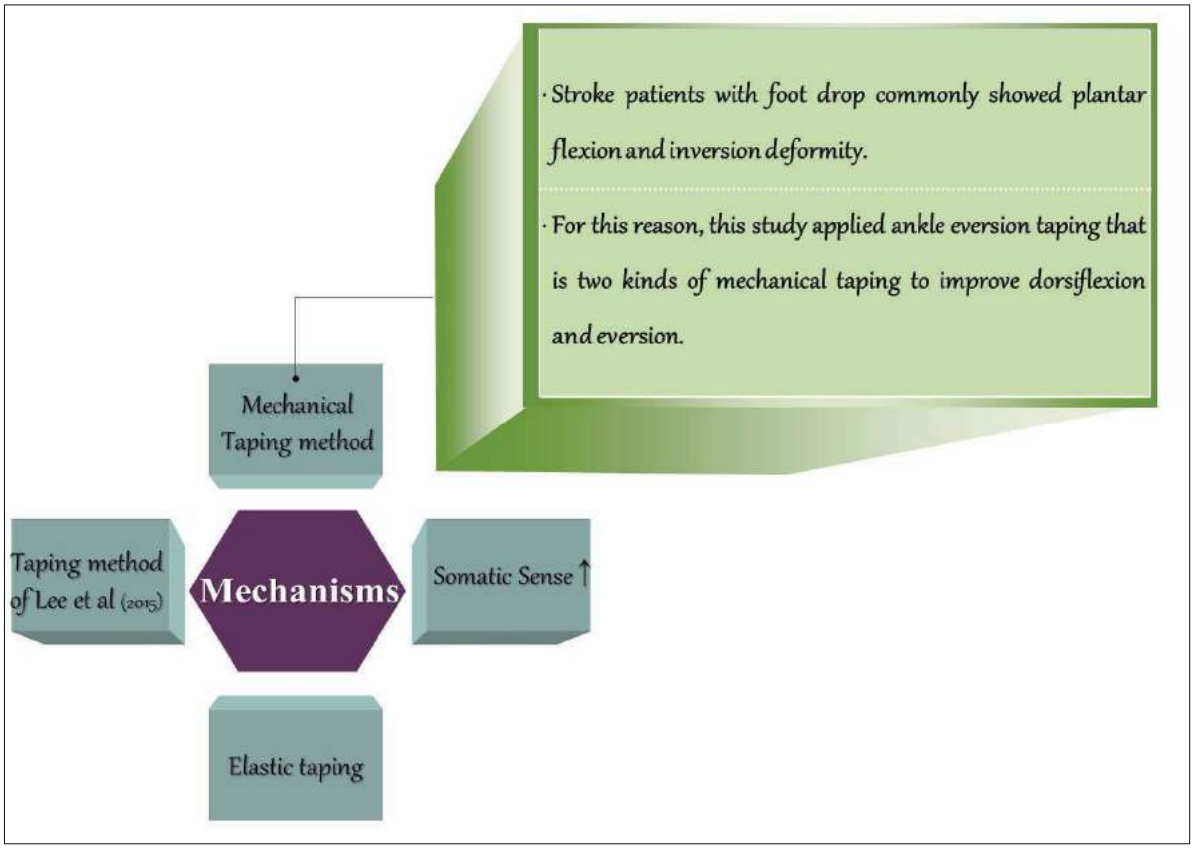

100
96
92
88
84
80
76
72
68
64
60
Stride length(cm)
*
*
NT
PT
AET

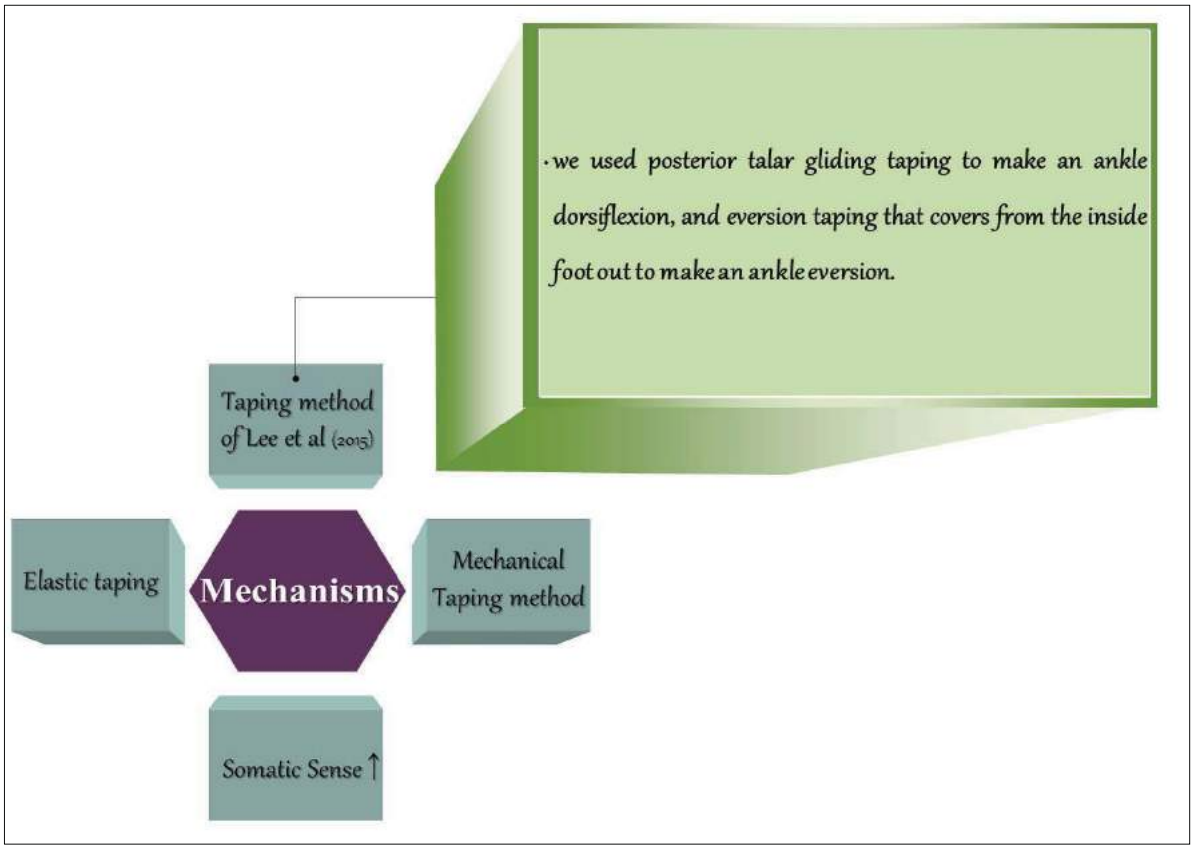

110
107
104
101
98
95
92
89
86
83
80
Cadence(Steps/m)
*
*
NT
PT
AET

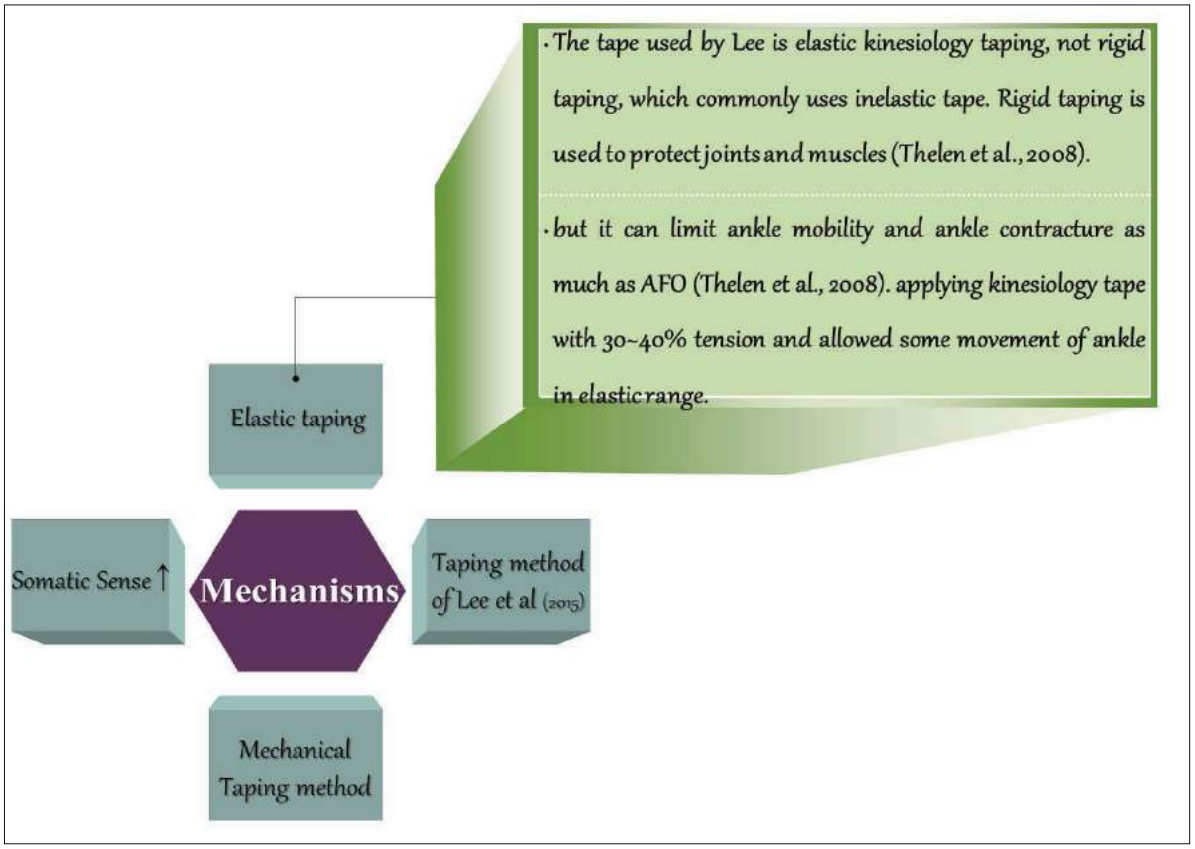
DISCUSSION

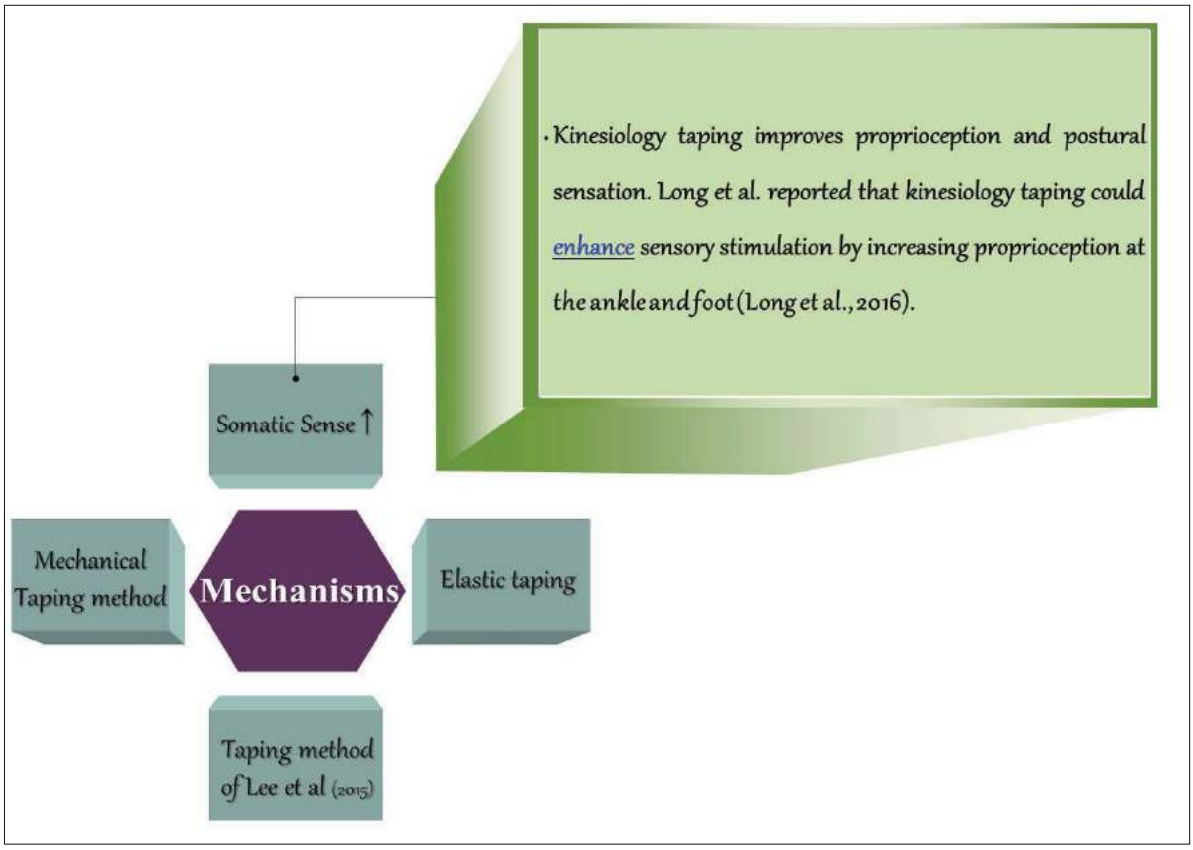
- This study was performed to evaluate the immediate effect of the gait ability in stroke patients with foot drop after applying ankle eversion taping.
- Gait velocity, step length, stride length, and cadence significantly increased in ankle eversion taping group compared to the other two groups (placebo and no taping condition).

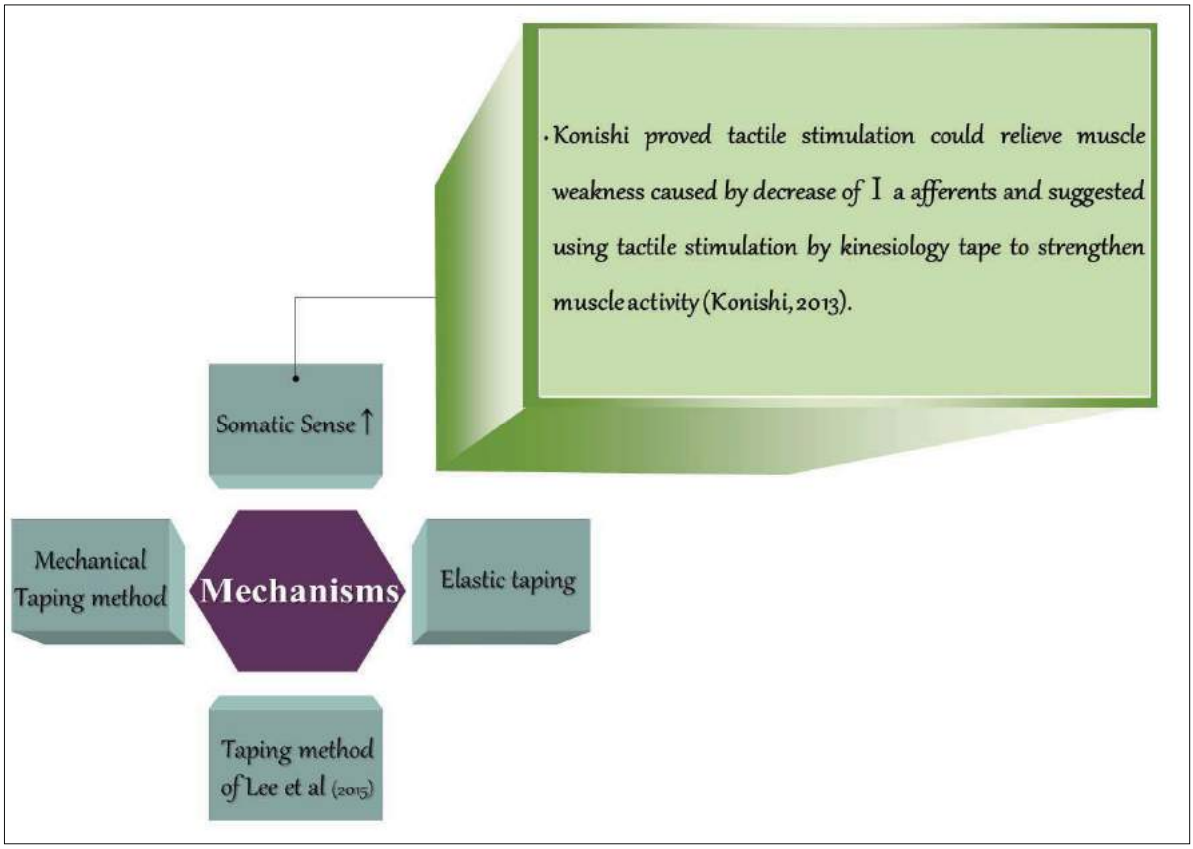

· Han et al. proved that rounded shoulder posture was immediately corrected using kinesiology taping with 30~40% tension.
· Lee at el. reported that posterior pelvic tilt taping with 30~40% tension could decrease the anterior pelvic tilt in women who usually wear high heels.
Mechanical Taping method
Taping method of Lee et al (2015)
Mechanisms
Somatic Sense ↑
Elastic taping

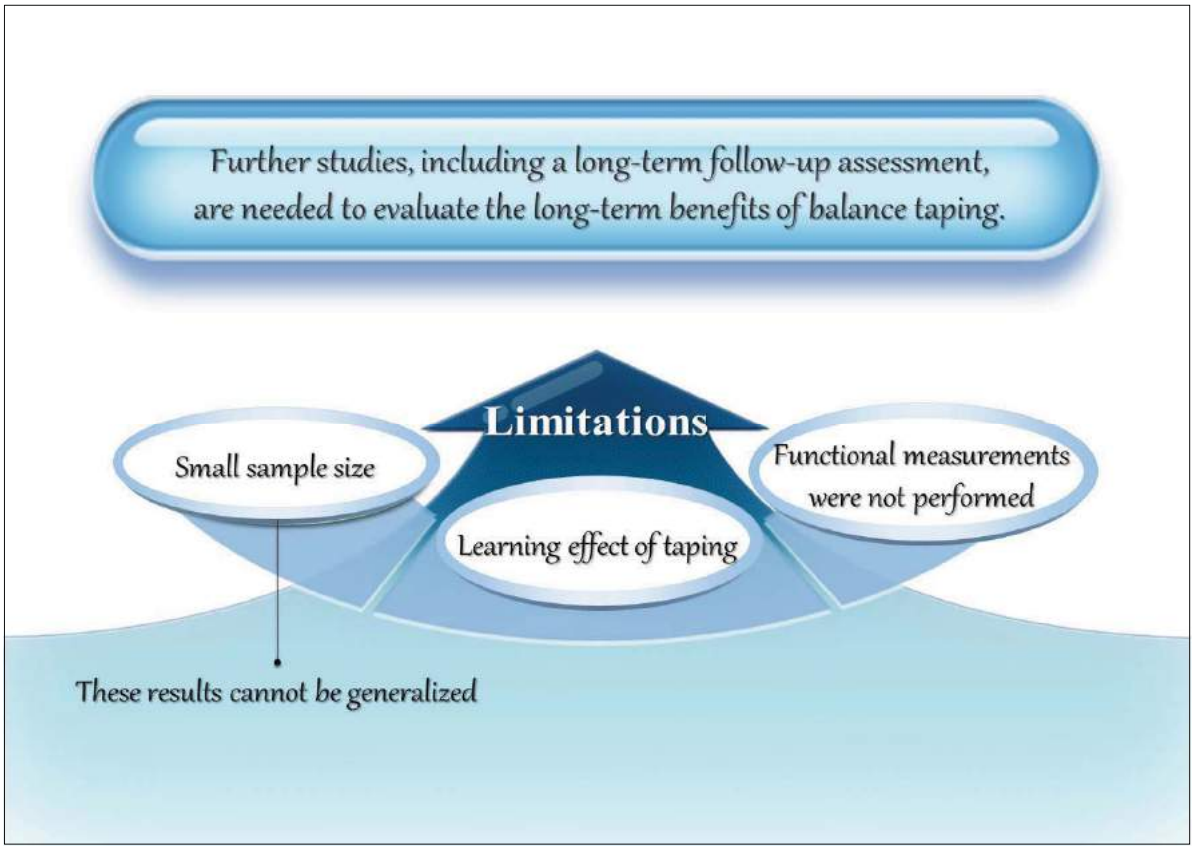

· Stroke patients with foot drop commonly showed plantar flexion and inversion deformity.
· For this reason, this study applied ankle eversion taping that is two kinds of mechanical taping to improve dorsiflexion and eversion.
Mechanical Taping method
Taping method of Lee et al (2015)
Mechanisms
Somatic Sense ↑
Elastic taping


we used posterior talar gliding taping to make an ankle dorsiflexion, and eversion taping that covers from the inside foot out to make an ankle eversion.
Taping method of Lee et al (2015)
Elastic taping
Mechanisms
Mechanical Taping method
Somatic Sense ↑


The tape used by Lee is elastic kinesiology taping, not rigid taping, which commonly uses inelastic tape. Rigid taping is used to protect joints and muscles (Thelen et al., 2008).
but it can limit ankle mobility and ankle contracture as much as AFO (Thelen et al., 2008). applying kinesiology tape with 30~40% tension and allowed some movement of ankle in elastic range.
Elastic taping
Somatic Sense ↑
Mechanisms
Taping method of Lee et al (2015)
Mechanical Taping method


• Kinesiology taping improves proprioception and postural sensation. Long et al. reported that kinesiology taping could enhance sensory stimulation by increasing proprioception at the ankle and foot (Long et al., 2016).
Somatic Sense ↑
Mechanical Taping method
Mechanisms
Elastic taping
Taping method of Lee et al (2015)


• Konishi proved tactile stimulation could relieve muscle weakness caused by decrease of Ⅰa afferents and suggested using tactile stimulation by kinesiology tape to strengthen muscle activity (Konishi, 2013).
Somatic Sense ↑
Mechanical Taping method
Mechanisms
Elastic taping
Taping method of Lee et al (2015)



Conclusion

We conclude that the application of ankle eversion taping that uses kinesiology tape instantly increased the gait ability of chronic stroke patients with foot drop. However, more research is necessary to identify the long term effects of the ankle eversion taping.


Thank You
감 사
합니다
by Shin Youngjun

포스터

session

몸통 안정화 근육들에 발란스 테이핑 적용이 낙상지수에 미치는 영향

김동주 · 이정훈[1†]

동의대학교 보건의과학과, [1]동의대학교 물리치료학과

The effects of balance taping on fall coefficient when applied on the trunk stabilization muscles

Dong-ju kim, PT, Jung-hoon Lee, PT, PhD[1†]

Department of Biomedical Health Science, Graduate School, Dong-Eui University
[1]Department of Physical Therapy, College of Nursing, Healthcare Sciences and Human Ecology, Dong-Eui University

〈Abstract〉

Purpose: The purpose of this study was to investigate the effects of balance taping on fall coefficient when they are applied on the trunk stabilizing muscles.

Methods: 6 health adults (2 males and 4 females) participated in this study. Balance taping was applied on latissimus dorsi, trapezius, rectus abdominis, external oblique and erector spinae bilaterally and the fall coefficient was evaluated using tetrax. SPSS 18.0 for windows was used for data analysis and the participants' gender, age and weight were analyzed using descriptive statistics. Changes in the fall coefficient were analyzed using Wilcoxon sign ranks test and the study's significance was set to $p<0.05$.

Results: After application of balance taping, the fall coefficient of the trunkstabilizing muscles significantly decreased from 76.50±16.13 to 55.83±20.02 ($p<0.05$).

Conclusion: Application of balance taping on the trunk stabilizing muscles will improve fall coefficient. Further study on the effects of balance tape on fall-risk patients would be necessary.

Key Words: Balance Taping, trunk stabilization muscle, tetrax, fall coefficient

† 교신저자: 이정훈, E-mail: dreampt@hanmail.net

외상성 뇌손상 환자의 우울증과 인지에 저빈도 반복적 경두개 자기 자극이 미치는 효과

이시아 · 김명권[1†]

대구대학교 일반대학원 재활과학과 물리치료전공, [1]대구대학교 물리치료과

Effect of Low Frequency Repetitive Transcranial Magnetic Stimulation on Depression and Cognition of Patients with Traumatic Brain Injury

Si-a Lee, PT, MS, Myoung-kwon Kim, PT, PhD[1†]

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

〈Abstract〉

Purpose: This study was conducted to investigate the effects of low frequency repetitive transcranial magnetic stimulation of the right dorsolateral prefrontal cortex on depression and cognition in patients with traumatic brain injury.

Methods: To accomplish this, 13 subjects who were diagnosed with traumatic brain injury were divided into an experimental (n = 7) and a control group (n = 6) that received rTMS and sham rTMS during a 30 minute session five days per week for two weeks. The subjects were then evaluated for depression using the Montgomery-Asberg Depression Rating Scale (MADRS) and for cognitive function using the Trail Making Test (TMT) and Stroop Color Word Test (SCWT).

Results: A significant decrease in MADRS, TMT and SCWT was observed after intervention in the experimental group (p<0.01), and there was a significant difference in the change value of MADRS, TMT and SCWT compared to the control group (p<0.01). Moreover, the effect size for gains in the experimental group and control group was very strong for MADRS, TMT and SCWT (effect size=1.44, 1.49, 1.24 respectively).

Conclusion: The results of this study suggest that application of low frequency repetitive transcranial magnetic stimulation to the right dorsolateral prefrontal cortex of patients with traumatic brain injury has a positive effect on depression and cognition.

Key Words: Transcranial magnetic stimulation, Traumatic brain injury, Depression, Cognition

† 교신저자: 김명권, E-mail: kimmk@daegu.ac.kr

저빈도 경피신경전기자극의 자극강도가 위등세모근의 이완에 미치는 영향*

김충유 · 강종호[1]

부산성모병원 재활의학과, [1]부산가톨릭대학교 물리치료학과

Effects of stimulation intensity of low frequency transcutaneous electrical nerve stimulation on relaxation of the upper trapezius

Chung-yoo Kim, PT, MS, Jong-ho Kang, PT, PhD[1]

Department of Rehabilitation Medicine, Busan St. Mary's hospital
[1]Department of Physical Therapy, Catholic University of Pusan

〈Abstract〉

Purpose: The purpose of this study was to investigate the effects of the stimulation intensity and application time of low frequency TENS on the relaxation of the upper trapezius.

Methods: Twenty-three men in their 20s participated voluntarily after listening to the purpose and method of the study. All subjects were assigned to a condition receiving TENS for 15 minutes with sham stimulation (SS), sensory threshold stimulation(STS), and motor threshold stimulation(MTS), All subjects participated in all three conditions. Before the TENS application, all subjects performed a typing task for 20 minutes to increase the tension in the upper trapezius. TENS were set at 4Hz and 200ms and were given motor threshold, sensory threshold, and sham stimulation for each group for 15 minutes. The root mean square and muscle hardness of right upper trapezius were measured before and after TENS to measure the relaxation effect of TENS on the upper trapezius. The autonomic nervous system activity measured from heart beat variability(LF, HF, LF/HF) was also measured before and after TENS to measure the relaxation effect of TENS on the upper trapezius. Comparisons of measurements were made between stimulation intensity, using one-way ANOVA.

Results: After 15 minutes of TENS application, the muscle activity of the upper trapezius showed a significant difference among the types of stimulation intensity; the post hoc test showed the highest value of SS and the lowest value of MTS. After 15 minutes of TENS application, the autonomic nervous activity ratio showed a significant difference among the types of stimulation intensity; the post hoc test showed the lowest value of MTS.

Conclusion: The application of low frequency TENS to provide relaxation of upper trapezius was most effective when applied for 15 minutes with motor threshold stimulation. The relaxation effect by TENS was influenced by decreased activity of sympathetic nervous system.

Key Words: Low frequency TENS, Motor threshold stimulation, Muscle relaxation

+ 교신저자: 강종호, E-mail: swithun@cup.ac.kr

* 본 연구는 학위논문 발췌논문입니다.

운동 타입이 머리전방자세 대상자의 자세 변화에 미치는 영향: 체계적 문헌 고찰 및 메타 분석

나정곤 · 이한숙[1†] · 박선욱[2]

을지 대학원 물리치료학과, [1]을지대학교 물리치료과, [2]삼성의료원 물리치료실

Effect of Exercise Type on Postural changes in Subjects with Forward Head Posture: Systematic Review and Meta-Analysis

Jeong-gon Na, PT, Han-suk Lee, PT, PhD[1†], Sun-wook Park, PT, PhD[2]

Department of Physical Therapy, Graduate School of Eulji University
[1]Department of Physical Therapy, Eulji University
[2]Department of Physical Therapy, Samsung Medical Center

〈Abstract〉

Purpose: The purpose of this study was to conducted to investigate the effects of type of exercise on postural changes in subjects with forward head posture.

Methods: Two independent researchers conducted a search using KISS, RISS, DBpia (domestic), PubMed, OVID and Science Direct (overseas) databases. We selected randomized controlled trials by searching using the terms “forwarad head posture”, “exercise therapy” and “therapeutic exercise”. Studies published from 2007 to December 2017 were included. PEDro Scale was used to evaluate the quality of the selected studies and meta-anlaysis was conducted using CMA program. This study was registered at PROSPERO (CRD42018068633).

Results: Of the 13768 studies searched, 15 were selected. Positive effect on Postural changes were achieved with biomechanical element (ES=1.45, 95% [CI] .64 to 2.25).

Conclusion: The most effective exercise type of postural changes is biomechanical elements. It’s more effective than combination exercise.

Key Words: Exercsie therapy, Meta-analysis, Posture

† 교신저자: 이한숙, E-mail: leehansuk21@hanmail.net

뇌졸중 환자를 대상으로 다양한 발 위치에 따른 일어서기 운동시 지면 반발력에 미치는 영향*

노현제†

고려대학교 보건 과학과 재활 과학 전공

The changes of the ground reaction force according to the various foot position during sit to stand in stroke patients

Hyeon-je Noh, PT†

Major in Rehabilitation Science, Department of Health Science of Korea University

〈Abstract〉

Purpose: The purpose of this study was to investigate effects of different foot positioning during sit to stand performed by individuals with hemiparetic stroke and determined the influence of level of difficulty for application of appropriate exercise.

Methods: 15 male and female with stroke(4 females, 11 males, mean age: 61.13± 9.12 years) were participated in this study. The subjects performed sit to stand with: (1) symmetric foot position, (2) affected foot placed to side as long as foot width (3) unaffected foot placed to side as long as foot width. The researcher instructed each subject to perform 5 sit to stands for each of the foot positions. The subjects were asked to perform sit to stand as comfortable velocity and remain standing for 5 seconds while the peak vertical ground reaction force were measured using force platforms.

Results: Our results showed that there were significantly differences of the peak vertical ground reaction force among 3 sit to stand methods($p<0.05$).

Conclusion: We recommend performing sit to stand with unaffected foot placed to side as long as foot width for symmetric balance training in stroke patients.

Key Words: Ground reaction force, Sit to stand, Stroke

† 교신저자: 노현제, E-mail: guswosh@nate.com

* Thesis directed by Professor Hyeong-Dong Kim, PT, PH.D.

웨어러블 기기를 이용한 모바일 헬스 케어가 화학 요법을 받는 위암 환자의 활동량에 미치는 영향

안소연 · 김형동[1†]

고려대학교 대학원 보건과학과, [1]고려대학교 보건과학대학 보건환경융합과학부

The effect of mobile health care using wearable device on physical activity in gastric cancer patients undergoing chemotherapy

So-yeon An, PT, MS, Hyung-dong Kim, PT, PhD[1†]

Department of Health Science, The Graduate School, Korea University
[1]Department of Physical Therapy, College of Health Science, Korea University

〈Abstract〉

Purpose: This study investigated to identify the change in physical activity and quality of life of gastric cancer patients undergoing chemotherapy after management using mobile health (mHealth) care with mobile application and wearable device.

Methods: Gastric cancer patients undergoing chemotherapy were enrolled for a 12-week mHealth care. The patients were provided with cancer-related general information, nutritional information and regular rehabilitation exercises through mHealth application. All of the evaluation were performed total three times at the baseline, 6 weeks and 12 weeks follow up. The physical activity was analyzed using International Physical Activity Questionnaire-Short Form (IPAQ-SF). Nutritional status was assessed using the Patient-Generated Subjective Global Assessment (PG-SGA) questionnaire. And the quality of life was analyzed using European Organization for Research and Treatment of Cancer (EORTC) QLQ-C30 questionnaire.

Results: The physical activity and nutritional status were gradually improved although they were statistically insignificant. The quality of life was improved in most of the domains, with significant improvement in social functioning.

Conclusion: The provision of mHealth using mobile application and wearable device had beneficial aspects in promoting some improvement in physical activity, nutritional status and quality of life in gastric cancer patients undergoing chemotherapy.

Key Words: gastric cancer, chemotherapy, mobile health, wearable device, physical activity

† 교신저자: 김형동, E-mail: hdkimx@korea.ac.kr

계단 오르기 시 복부 드로잉-인 방법이 몸통 및 다리의 근 활성도에 미치는 영향

이수경 · 안수홍[1†]

동의대학교 물리치료학과, [1]동의대학교학 보건의과학과 물리치료전공

The Effects of Abdominal Drawing-in Maneuver during Stair Climbing on Muscle Activities of the Trunk and Legs

Su-kyoung Lee, PT, PhD, Su-hong Ahn, PT, MS[1†]

Department of Physical Therapy, College of Nursing, Healthcare Sciences, Dong-Eui University
[1]Department of Biomedical Health Science, Graduate School, Dong-Eui University

〈Abstract〉

Purpose: This study investigates the changes in the muscle activities of the trunk and legs depending on the application of abdominal drawing-in maneuver during stair climbing.

Methods: The subjects of this study were 23 adults (15 males and 8 females). The subjects were trained abdomibal drawing-in maneuver for 15 minutes using a pressure biofeedback unit. Their muscle activities were measured with and without abdominal drawing-in maneuver during stair climbing. The muscle activities were measured for the right sternocleidomastoid muscle, splenius capitis muscle, rectus abdominis muscle, external abdominal oblique muscle, transverse abdominis muscle, erector spinae muscle, vastus medialis muscle, and vastus lateralis muscle (TM DTS, Noraxon, USA). For statistical processing of data, a paired t-test was performed using SPSS 18.0 (IBM).

Results: The muscle activities of the transverse abdominis muscle, vastus medialis muscle, and vastus lateralis muscle with abdominal drawing-in maneuver during stair climbing were significantly greater than without abdominal drawing-in maneuver ($p < 0.05$), and the muscle activity of the erector spinae muscle with abdominal drawing-in maneuver during stair climbing was significantly smaller than without abdominal drawing-in maneuver ($p < 0.05$).

Conclusion: Abdominal drawing-in maneuver is recommended as a measure to increase exercise efficiency during stair climbing.

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

† 교신저자: 안수홍, E-mail: lkw2473@hanmail.net

계단 오르기 훈련이 퇴행성 무릎 관절염 환자의 고유수용성감각, 균형 및 하지 근력에 미치는 영향

윤정렬 · 김형동[1†]

고려대학교 일반대학원 보건과학과 재활과학전공, [1]고려대학교 보건과학대학 보건환경융합과학부

Effects of Stair-Climbing Training on Proprioception, Balance and Leg Strength in Patients with Knee Osteoarthritis

Jeong-ryeol Yoon, PT, BSc, Hyung-dong Kim, PT, PhD[1†]

Department of Health Science, The Graduate School, Korea University
[1]School of Health and Environmental Science, College of Health Science, Korea University

〈Abstract〉

Purpose: The purpose of this study was to examine the effects of 8-weeks stair climbing training on Proprioception, balance and leg strength in patients with knee osteoarthritis.

Methods: Thirty patients with knee osteoarthritis were divided into two groups, with 15 patients in each. The control group received general physical therapy, and the experimental group received stair climbing training with general physical therapy. Experimental group started on a 8-weeks progressive stair climbing program and was provided three times a week by experienced research assistants. Each training session comprised a general warm-up and the main stair climbing training. A multi-level (twelve levels) hospital served as training location. In total, 144 steps lead to the twelve floor (12 steps per level). During each climb, participants ascended 12 flights divided into two sets of six flights each, with a 2-minute rest period between each set. Proprioception acuity(joint position sense) and Peak torque(leg strength) were assessed before and after intervention by using Biodex multi-joint system 4 pro. Balance was assessed before and after intervention by using Biodex balance system SD.

Results: The results of this study were as follows: 1) Comparison within group revealed that the experimental group showed significant differences after the intervention in balance, peak torque extensor60°, 90°, 120°, peak torque flexor60°, 90°, 120°($p<.01$) and control group showed significant differences after the intervention in peak torque extensor60°, 90°, 120°($p<.05$). 2) Comparison between the groups revealed significant differences in peak torque extensor60°, 90° and peak torque flexor60°($p<.05$) 3) No statistically significant differences in proprioceptive acuity was found in both groups($p>.05$).

Conclusion: Our findings indicate that stair climbing training is effective for improving balance and leg strength in patients with knee osteoarthritis. This study suggests the effect of stair climbing as one of the strength training methods that can be easily accessed in daily life and saves time and cost.

Key Words: Stair climbing, Proprioception, Balance, Leg strength, Osteoarthritis

† 교신저자: 김형동, E-mail: hdkimx@korea.ac.kr

VR 이용에 따른 목세움근과 위등세모근의 필로와 목굽힘의 변화

장철웅 · 김정성 · 신수호 · 최희정 · 이대희† · 한슬기

유원대학교 물리치료학과

Changes in erector spinae and upper trapezius fatigue and neck bending due to the use of VR

Chul-woong Jang, Jeong-seong Kim, Su-ho Shin,
Hee-jung Choi, Dae-hee Lee, PT, PhD†, Seul-ki Han, PT, PhD

Department of Physical Therapy, U1 University

〈Abstract〉

Purpose: We investigated fatigue in the erector spinae and upper trapezius muscles, changes in the neck bending angle when watching 360° videos, general videos using virtual reality (VR), and smartphones.

Methods: The subjects were 34 healthy South Korean college students. Hardware used was VR Gear 3 and the Galaxy S8, and the testing video "STAR WARS 360 VR" made by Cube CZ. The subjects were tested under the following conditions: 1) watching 360° video with VR, 2) watching 360° video on a smartphone, 3) watching general video with VR, 4) watching general video on a smartphone. The subjects watched a 10-min video under each condition, during which the median frequencies of the erector spinae and upper trapezius muscles were measured using electromyography, and changes in neck bending angle were measured with an electrogoniometer.

Results: Both muscles were significantly fatigued over time in all conditions, with significant differences depending on time and conditional effect. Watching 360° videos was less fatiguing than watching general videos. Neck muscles moved most when watching 360° video with VR, and least when watching 360° video.

Conclusion: These results suggested that the erector spinae and upper trapezius muscles were less fatigued when watching 360° video.

Key Words: Fatigue, Median frequency, Virtual reality

† 교신저자: 이대희, E-mail: dhlee@gmail.com

발목균형테이핑이 급성발목염좌의 동적균형 및 보행 시 힘과 압력분표에 미치는 즉각적인 효과: 사례 연구

이정훈†

동의대학교 물리치료학과

The immediate effects of ankle balance taping on dynamic balance of acute ankle sprain and ambulatory force and pressure: A Case Study

Jung-hoon Lee, PT, PhD†

Department of Physical Therapy, College of Nursing, Healthcare Sciences and Human Ecology, Dong-Eui University

〈Abstract〉

Purpose: In this study, the immediate effects of ankle balance taping (ABT) using kinesiology tape on dynamic balance and ambulatory/stationary force and pressure were investigated in a female patient with acute ankle sprain.

Methods: In a female patient with acute sprain of the left ankle, changes in dynamic balance before and after application of ABT was measured using Y-BALANCE test. Furthermore, the patient's ambulatory/stationary force and pressure were measured before and after application of ABT using ZBRIS.

Results: While the patient was standing on the left leg, the right leg's anterior, posterolateral and posteromedial reach distances of Y-BALANCE were improved from 29, 56 and 54 to 38, 66 and 63 respectively after the application of ABT. Improvements in ambulatory/stationary force and pressure after application of ABT were also observed when measured with ZBRIS.

Conclusion: ABT using kinesiology tape could be a treatment method in patients with acute ankle sprain that would immediately improve dynamic balance and ambulation. Further studies targeting a large number of acute ankle sprain patients should be conducted to determine the effects of ABT on dynamic balance and ambulation.

Key Words: Ankle sprain, Balance Taping, Y-Balance

† 교신저자: 이정훈, E-mail: dreampt@hanmail.net

건강한 성인의 무릎보행과 정상보행 사이의 근활성도 비교

이준혁† · 권해연[1]

워크재활병원 물리치료실, [1]동의대학교 물리치료학과

Comparison of the Muscle Activity between the Kneeling Gait and the Normal Gait in Healthy Adults

Jun-hyuk Lee, PT†, Hae-yeon Kwon PT, PhD[1]

Department of Physical Therapy, Walk-rehab Hospital
[1]Department of Physical Therapy, Dong-Eui University

〈Abstract〉

Purpose: Although there are numerous education implemented on kneeling position for adult stroke patient, there is absolute lack of clinical evidence. Therefore this study was executed to provide trunk stability information in accordance with the characteristics of gait exercise to healthy adult as preceding study prior to application to patients.

Methods: In this study, subject who are voluntarily participating in the research were selected after having sufficiently explained the purposes and methods of the research to 15 healthy males and females with no history of damages to musculoskeletal system within the last 6 months as the subjects. Muscle activities in the trunk and legs were measured when normal adults are executing kneeling gait and normal gait on 10m mat with ground reaction force at the pace they feel comfortable. Muscle activities of trunk and legs in accordance with the characteristics of gait exercise were measured in six muscles 3 times each by using EMG of NORAXON of USA. Average of these 3 measurements was used. Data collected from this study was analyzed with SPSS 23.0 program for Windows(IBM corp, USA) with the level of statistical significance set at 0.05. Difference in the muscle activities of the trunk and legs at the time of kneeling gait and normal gait was analyzed by means of Wilcoxon signed rank test, which is a non-parametric method.

Results: As the results of comparison of differences in the muscle activities in accordance with the gait exercise characteristics of normal adults, the muscle activities of rectus abdominis and elector spine in the trunk displayed significant difference between kneeling gait and normal gait ($p<0.05$). Although there was no significant difference in the muscle activities of gluteus maximus in the leg, the muscle activities of gluteus medius, rectus femoris and semi tendinosus displayed significant difference between kneeling gait and normal gait ($p<0.05$).

Conclusion: As a preceding study for provision of information on trunk stability in accordance with the gait exercise characteristics to the stroke patients, this study found as the result of comparison of the differences in muscle activities after having executed kneeling gait and normal gait on mat with ground reaction force at pace comfortable for normal adults as the subjects that the levels of muscle activities in the trunk and legs are higher during kneeling gait than normal gait. Such results imply that performing gait exercises in kneeling position is more effective in fortifying the muscles in the trunk of the body that in standing posture for stroke patients who need to have stability in their body trunk.

Key Words: Healthy adults, Kneeling giat, Normal gait, Muscle activity

† 교신저자: 이준혁, E-mail: jhyuk0213@gmail.com

경사로 보행 시 복부 드로잉-인 기법이 몸통 및 다리의 근 활성도에 미치는 영향

이수경 · 이혜지† · 김지연 · 민영재 · 박미정 · 장은진 · 정혜빈 · 조재성 · 최혜주

동의대학교 물리치료학과

The Effects of Abdominal Drawing-in During Ramp Walking On Muscle Activities Of The Trunk And Legs

Su-kyoung Lee, PT, PhD, Hye-ji Lee†, Ji-yeon Kim, Young-jae Min, Mi-jeong Park, Eun-jin Jang, Hye-bin Jeong, Jae-sung Jo, Hye-ju Choi

Department of Physical Therapy, College of Nursing, Healthcare Sciences, Dong-Eui University

〈Abstract〉

Purpose: This study aimed to examine the effects of the abdominal drawing-in maneuver (ADIM) on muscle activity while walking on a ramp.

Methods: The subjects were healthy adult males (N=15) and females (N=8) in their 20s. The subjects were asked to maintain the ADIM contraction for 15 minutes using a pressure biofeedback unit. Their muscle activity was then measured while going up and down the ramp, maintaining the ADIM contraction. In addition, their muscle activity was measured while going up the ramp with and without the ADIM contraction maintained. Muscle activity of the sternocleidomastoid, splenius capitis, rectus abdominis, external oblique abdominal, transversus abdominis, erector spinae, vastus medialis, and vastus lateralis was measured using surface electromyography (TM DTS, Noraxon, USA). Apaired samples t-test and an independent samples t-test were conducted using SPSS 18.0 (IBM) for statistical processing of the data.

Results: There was no significant difference in muscle activity among all the muscles when the subjects went up and down the ramp while maintaining the ADIM contraction. However, while going up the ramp, muscle activity of the rectus abdominis, transversus abdominis, vastus medialis, and vastus lateralis was greater with significant increase ($p < .05$), and muscle activity of the erector spinae was smaller with significant decrease ($p < .05$) when the ADIM contraction was maintained compared to when it was not maintained.

Conclusion: Although there was no significant difference in muscle activity between going up the ramp and going down the ramp, there was a significant difference in muscle activity while going up the ramp between with and without ADIM maintained contraction. Therefore, this study proposes going up the ramp with the ADIM contraction maintained.

Key Words: Ramp, Pressure Biofeedback Unit, Abdominal Drawing-in Maneuver, Muscle Activity

† 교신저자: 이혜지, E-mail: 2653214@daum.net

크로커다일 호흡운동이 요통환자의 통증과 근긴장도에 미치는 영향

조용호 · 황윤태[1] · 최진호†

대구한의대학교 물리치료학과, [1]강릉영동대학교 물리치료과

Effects of Crocodile Breathing Exercise on Pain and Trunk Muscle Tone

Yong-ho Cho, PT, PhD, Woon-tae Hwang, PT, PhD[1], Jin-ho Choi, PT, PhD†

Department of Physical Therapy, Daegu Haany University
[1]Department of Phyical Therapy, Gangneung Yeongdong University

〈Abstract〉

Purpose: The purpose of this study was to investigate the effect of crocodile respiration on back pain patients.

Methods: A total of 40 participants were enrolled in this study. Each group consisted of 20 subjects. One group performed crocodile breathing exercise and the other group performed general thoracic breathing exercise(CG). The intervention duration was 8 weeks, and respiration was performed for 10 minutes every day. During the intervention period of 8 weeks, 1 person was dropped from each group and finally 38 subjects were applied. The measured variables were pain(VAS) and muscle tone(Myoton pro).

Results: Changes in pain following intervention were significantly reduced in EG, CG($p<.05$). Muscle tone was significantly difference in crocodile breathing exercise group($p<.05$).

Conclusion: This study suggests that proper breathing exercise for low back pain patients will be an effective intervention for the management of back pain. In particular, Crocodile respiratory exercise program is expected to be a good exercise in low back pain patients.

Key Words: crocodile breathing exercise, muscle tone, pain

† 교신저자: 최진호, E-mail: choipt88@gmail.com

만성기 뇌졸중 환자의 스트레스, 불안-우울, 근긴장도 및 근력사이의 관계: 부분상관관계

김명권[1] · 최유원[2] · 김성길[3] · 최은홍[2†]

[1]대구대학교 재활과학대학 물리치료학과, [2]대구대학교 재활과학대학원 물리치료학과, [3]위덕대학교 물리치료학과

Relationship among Stress, Anxiety-depression, Muscle Tone, and Hand Strength in Patients with Chronic Stroke: Partial Correlation

Myoung-kwon Kim, PT, PhD[1], Yu-won Choe, PT, MS[2],
Seong-gil Kim, PT, PhD[3], Eun-hong Choi, PT, MS[2†]

[1]Department of Physical Therapy, College of Rehabilitation Science, Daegu University
[2]Department of Physical Therapy, Graduate School of Rehabilitation Science, Daegu University
[3]Department of Physical Therapy, Uiduk University

〈Abstract〉

Purpose: This study was conducted to identify the relationship among stress response inventory, hospital anxiety and depression, muscle tone and stiffness, and hand strength in chronic stroke.

Methods: A total of 14 chronic stroke patients who voluntarily agreed to this experiment were included in this study. In this study, all measurements were performed in one day and in the room without noise. The test conduced in this study were as follows: 1) muscle tone and stiffness measurement of upper trapezius, 2) hand grip measurement. Subjects were asked to complete surveys describing the following: 1) stress response inventory, 2) hospital anxiety and depression scale.

Results: There were significant correlations among stress response inventory and hospital anxiety and depression, stress response inventory and hand strength, and hospital anxiety and depression and hand strength (P<.05). There were high positive correlations between stress response inventory and hospital anxiety and depression (r=.979), while there were moderate negative correlations between stress response inventory and hand strength (r=-.415) and moderate negative correlations between hospital anxiety and depression and hand strength(r=-.420).

Conclusion: The results of the present study indicate that there was a relationship among stress response inventory, hospital anxiety and depression, and hand strength in patients with chronic stroke.

Key Words: Depression, hand strength, Muscle tone, Stroke, Stress

† 교신저자: 최은홍, E-mail: silvered1@hanmail.net

축구 경기 후 발생한 급성 요통의 발란스 테이핑 적용: 사례 연구

최현수 · 이정훈[1†]

동의대학교 보건의과학과, [1]동의대학교 물리치료학과

Effects of balance taping on acute low back pain after a soccer game: A case report

Hyun-su Choi, MS, Jung-hoon Lee, PT, PhD[1†]

Department of Biomedical Health Science, Graduate School, Dong-Eui University
[1]Department of Physical Therapy, College of Nursing, Healthcare Sciences and Human Ecology, Dong-Eui University

〈Abstract〉

Purpose: To examine the effects of balance taping using kinesiology tape on acute low back pain after a soccer game.

Case Description: A 26-year-old male developed acute low back pain the day after a soccer game. He could not sit or walk and was diagnosed with lumbar and other intervertebral disc disorders with radiculopathy after an examination at neurosurgery. He had surgery for a herniated disc in April 2010 and mentioned that he occasionally felt pain of VAS 1-2 in the lower back. He had VAS 6 pain in the right lower back and had limited trunk flexion and lateral flexion.

Results: After applying 12 rounds of balance taping on low back and back muscles, the patient's Korean Version of ODI (Oswestry Disability Index) decreased from 27 to 7 and Patient Specific Functional and Pain Scales (PSFS) increased from 1 to 47. Lumbar flexion (Modified Schober) increased from 16.5cm to 21cm. Lateral Spinal flexion (length from floor to tip of finger) decreased from 61cm to 47cm in the left and from 59.5cm to 45cm in the right. Trunk Rotation increased from 15° to 45° in the left and from 10° to45° in the right.

Conclusion: Balance taping is helpful for reducing pain and increasing the range of motion of the lower back in patients who developed acute low back pain after a soccer game. Additional studies are needed to substantiate the effects of balance taping on patients with acute low back pain.

Key Words: Balance Taping, Soccer, Kinesioloy Tape, Acute Low Back Pain

† 교신저자: 이정훈, E-mail: dreampt@hanmail.net

스마트폰을 이용한 보행분석의 신뢰도 연구

박병규 · 김지영 · 신윤영 · 정현경 · 한슬기† · 이대희

유원대학교 물리치료학과

Study on Reliability of Gait Analysis Using Smartphone

Beong-gyu Park, Ji-yong Kim, Yoon-young Shin, Hyun-kyeong Jung,
Seul-ki Han, PT, PhD†, Dae-hee Lee, PT, PhD

Department of Physical Therapy, U1 University

〈Abstract〉

Purpose: The purpose of the present study was to investigate the reliability of smartphone-based measurements of the torso, thigh, and shin segmental angles and the hip and knee joint angles during gait.

Methods: The subjects in the study included eight young and healthy college students. In this study, smartphones were used to determine the changes in angles when the subjects walked with smartphones attached to their torso (lower back), thigh, and shin. The obtained angles represented segmental angles for the torso, thigh, and shin, which were used to calculate hip and knee joint angles. Measurements were performed by the test-retest method to evaluate the agreement between the test and retest results.

Results: The results showed a very high reliability for the torso and shin segmental angles and a high reliability for the thigh segmental angle and hip and knee joint angles.

Conclusion: The findings of the present study reveal that smartphones can be sufficiently useful as devices for gait analysis.

Key Words: Gait analysis, Smartphone, Reliability

† 교신저자: 한슬기, E-mail: lovewisd@gmail.com

근력강화훈련이 뇌성마비 아동의 보행능력과 대동작 기능에 미치는 영향에 대한 체계적 고찰과 메타분석

허성경 · 이한숙[1†] · 박선욱[2]

성남시장애인종합복지관, [1]을지대학교 물리치료과, [2]삼성병원

The Effects of Strengthening Exercise on Gait Ability and GMFM in Cerebral Palsy: A Systematic Review and Meta-Analysis

Seong-gyeong Heo, PT[1], Han-suk Lee, PT, PhD[1†], Sun-wook Park, PT, PhD[2]

Department of Physical Therapy, Seongnam Welfare Center for the Disabled
[1]Department of Physical Therapy, Eulji University
[2]Department of Physical Therapy, Samsung Medical Center

〈Abstract〉

Purpose: The purpose of this study is to perform a systemic review of studies that examine the effects of strengthening exercise on gait ability and GMFM in children with cerebral palsy and propose a standard for cerebral palsy therapy based on a meta-analysis of the studies.

Methods: An extensive literature search was conducted using databases including KISS (Korean studies Information Service System), RISS, DBpia, PubMed and ScienceDirect, and using the following search terms: 'Strengthening Exercise,' 'Resistance Exercise,' 'Gait ability,' 'GMFM' or 'cerebral palsy'.

Results: Eleven studies were included in this review. The duration of the intervention varied from 5 to 24 weeks. The number of application per week was mostly 2～3 times, while 5 times per week intervention was adopted in a few cases. The total number of intervention application varied from 18 to 36. The effect sizes of GMFM in crawling and sitting were very high at 1.075 and .881, but the effect sizes of GMFM in standing and walking were very low, at .206 and .125, respectively. As for the gait speed, the effect size was as low as .221.

Conclusion: Both trunk exercise and lower limb exercise were effective for improving GMFM in children with cerebral palsy, showing improved outcomes in sitting and crawling. Findings from this study will useful for designing evidence-based cerebral palsy therapy programs.

Key Words: Cerebral palsy, Gait ability, GMFM, Resistance exercise, Strengthening exercise

† 교신저자: 이한숙, E-mail: leehansuk21@hanmail.net

일반

session

시각차단 유무가 불완전 경수 손상 환자의 신체 흔들림과 근활성도에 미치는 영향

권 솔[1] · 김명권[2†]

[1]대구대학교 재활과학대학원 물리치료학과, [2]대구대학교 물리치료학과

The Effects of Visual Interruption on Body Sway and Muscle Activity In Patients with Incomplete Cervical Cord Injury

Sol Kwon, PT, MS[1], Myung-kwon Kim, PT, Professor[2†]

[1]Department of Physical Therapy, Daegu University
[2]Department of Physical Therapy, Daegu University

〈Abstract〉

Purpose: The purpose of this study is to investigate the effect of visual interruption on the body sway and muscle activity in patients with incomplete cervical cord injury compared with normal adults.

Methods: The subjects of this study were 13 patients with incomplete cervical cord injury and 13 normal adults. In order to measure the body sway and muscle activity in the standing posture, the order of visual opening and blocking was randomly determined and repeated 3 times for 20 seconds under each condition.

For measure the body sway, we used a balance ability measuring instrument (Biorescue) to measure the moving area, length, and speed of the pressure center. To measure the EMG signals of both Internal oblique, erector spinae, tibialis anterior and medial gastrocnemius, a muscle activity measuring device (Desktop DTS) was used.

Results: There was a significant difference between the groups in length and speed of the pressure center, except for the ellipse of the pressure center. And there was significant difference in the ellipse, length, and average speed of the pressure center in the incomplete cervical cord injury group. In normal adult group, there was a significant difference only in the ellipse except for the length and speed of the pressure center.

There was a significant difference in both erector spinae, both tibialis anterior and both gastrocnemius activity in the incomplete cervical cord injury group according to whether or not the visual acuity was blocked. But there was no significant difference in both internal oblique in the incomplete cervical cord injury group. In normal adult group, there was a significant difference only in both gastrocnemius except for both internal oblique, both erector spinae and both tibialis anterior activity. And there was a no significant difference between the groups in all muscle activity.

Conclusion: The results of the study show that patients with incomplete cervical cord injuries maintain static balance in the standing posture, depending on visual information, compared with normal adults.

Based on this study, it is suggested that it would be a useful intervention method if we develop and apply equilibrium training using visual intercept for patients with incomplete cervical cord injuries.

Key Words: Visual interruption, Balance, Muscle activity, Incomplete cervical cord injury

† 교신저자: 김명권, E-mail: kimmk@daegu.ac.kr

장애아동의 물리치료 서비스에 대한 가족중심 관리의 만족도 조사연구

권해연† · 김병조[1]

동의대학교 물리치료학과, [1]동의대학교 물리치료학과

Study on the Survey of the level of Satisfaction on Family-centered Care for Physical Therapy Services in Disabled Children

Hae-yeon Kwon, PT, PhD†, Byeong-jo Kim, PT, PhD[1]

Department of Physical Therapy, Dong-eui University
[1]Department of Physical Therapy, Dong-eui University

〈Abstract〉

Purpose: This study was conducted to present the direction for the value, attitude and approach method for the provision of physical therapy service to disabled children and their families by surveying the level of satisfaction on how family-centered the physical therapy services provided to disabled children and their families.

Methods: In this study, guardians(legal representative) of disabled children provided with physical therapy services at medical institutions and centers, and welfare centers for children within Busan region were selected as the subject population through simple randomized sampling method. MPOC(Measure of Processes of Care)-20, which is a simplified version of the self-report type questionnaire developed to evaluate the medical services provided to the children and family over a period of the most recent 1 year, which is completed by the parents of the children, was used as the survey tool. After having instructed the subjects to choose an answer to the questions in the MPOC-20 questionnaire among the choices ranging from not applicable (0) and 1(not at all) to 7(very much so) for the events/situations presented in the question. Data collected in this study was analyzed by using SPSS 23.0 program for Windows(IBM Corp, USA). Analysis was made by means of frequency and percentage(%) in order to assess the level of satisfaction of family-centered care of physical therapy service of disabled children.

Results: A total of 129 guardians of disabled children participated in this study composed of 16 males (12.4%) and 113 females (87.6%) with average age of 37.17±3.30 years. The level of satisfaction of family-centered care on the physiotherapist providing the services directly to the disabled children was “slightly high” for 51 subjects (39.5%) and “average” for 21 subject (16.3%). The level of satisfaction of family-centered care on the staffs who manage and support physical therapy services, and institution at which physical therapy services were given was “average” for 74 patients (57.4%) and “very slightly” for 26 subjects (20.2%).

Conclusion: Since the role of the family members is very important to provide information to improve the prognosis of disabled children and to assist with the establishment of intervention plan appropriate for the goals that can realistically be accomplished, medical institutions treating (rehabilitation) children and physiotherapist need to provide family-centered physiotherapy services to the disabled children and their families.

Key Words: Disability, Children, Pediatric physical therapy, Family-centered care

† 교신저자: 권해연, E-mail: sunlotus75@deu.ac.kr

지지면 변화에 따른 시지각 입력 시 다운증후군 아동의 균형능력 비교

김병조† · 권해연[1]

동의대학교 물리치료학과, [1]동의대학교 물리치료학과

Comparison of Balance Ability of Children with Down's Syndrome at the Visual Perception Input according to Changes in the Supporting Surface

Byeong-jo Kim, PT, PhD†, Hae-yeon Kwon, PT, PhD[1]

Department of Physical Therapy, Dong-eui University
[1]Department of Physical Therapy, Dong-eui University

〈Abstract〉

Purpose: This study was executed to compare the difference in the static and dynamic balance ability of children with Down's Syndrome when visual information that imparts the greatest effect on postural sway is inputted on stable and unstable supporting surfaces.

Methods: In this study, children with Down's Syndrome in the age bracket of 5～13 years undergoing pediatric physiotherapy at medical and health institutions situated in Busan Metropolitan City were selected as the subjects. In order to compare the balance abilities of children with Down's Syndrome at the visual perception input in according to changes in the supporting surface (stable and unstable supporting surface), quasi-experimental study within group design was executed. The balance abilities of children with Down's Syndrome was measured by using BioRescue balance analysis system(Analysis systems by biofeedback, AP1153, RM Ingenierie, France). For static balance, area(㎠), distance(㎝) and speed of movement center of mass in front, rear, left and right directions were measured by using Romberg's sign. For dynamic balance, balance area was measure through the measurement values that correspond to the area of stable base of surface by means of stability limitations. Data collected from this study was analyzed with SPSS 23.0 program for Windows(IBM corp, USA) with the level of statistical significance set at 0.05. General characteristics of the subjects were assessed by means of descriptive statistics while the difference in static and dynamic balance at the time of visual perception input in according to the changes in the supporting surface was comparatively analyzed through paired t-test.

Results: Although children with Down's Syndrome did not display significant difference in static and dynamic balance on stable supporting surface irrespective of visual perception input, there was significant difference in static and dynamic balance on unstable supporting surface in accordance with visual perception input($p<0.05$).

Conclusion: Children with Down's Syndrome display difference in the static and dynamic balance in according to the changes in supporting surface and, in particular, were found to display sway of static and dynamic balance when visual perception input has been blocked on unstable supporting surface.

Key Words: Down's syndrome, Visual perception, Balance ability, Supporting surface

† 교신저자: 김병조, E-mail: pt123@deu.ac.kr

TENS를 사용한 초기 통증 조절이 무릎뼈관절염을 가진 쥐의 통증 감소에 미치는 영향

진창달 · 김명권[1] · 김승규[1] · 나상수[1] · 황보각[1†]

대구대학교 물리치료학과, [1]대구대학교 물리치료과

Effect of Initial Pain Control Using TENS on Pain Relief in Knee Osteoarthritis in a Rat Model

Chang-da Chen, MS, Myoung-kwon Kim, PT, PhD[1], Seung-kyu Kim, PT, PhD[1]
Sang-su Na, PT, PhD[1], Gak Hwang-Bo, PT, PhD[1†]

Department of Physical Therapy, Daegu University
[1]Department of Physical Therapy, Daegu University

〈Abstract〉

Purpose: The purpose of this study was to investigate the influence of treadmill exercise with Initial pain control (TENS) on induced osteoarthritis in rats.

Methods: A total of 30 adult male Sprague-Dawley rats were divided as TENS Group(TG), Treadmill Exercise Group(TEG), TENS + Treadmill Group(TTG). TG were performed for 20 min per day for two weeks with a TENS program at knee joint. TEG were performed treadmill exercise 15 m/min for 20 min per day for two weeks. TTG were performed initial pain control by TENS program 1～3 days, and treadmill exercise was performed by previously TEG methods from 4th days. Lumbar spine was extracted and processed using western blot analysis for evaluation of pain.

Results: The results showed that c-fos expression was decreased in all groups after intervention, especially TTG was the greatest significant decreased than other groups.

Conclusion: The result of this study suggest that treadmill exercise with initial pain control can be presents as one of the available methods to relieve pain in osteoarthritis.

Key Words: Knee osteoarthritis, Initial pain control, TENS, Treadmill exercise

† 교신저자: 황보각, E-mail: hbgak@daegu.ac.kr

Sit to Stand 시 다리 너비와 팔의 자세 변화에 따른 척추 세움근과 큰 볼기근의 근활성도

제민욱 · 이한숙† · 김준호

을지대학교 물리치료과

Muscle activity of erector spinae and gluteus maximus according to change of the leg width and arm posture during Sit To Stand

Min-wook Je, Han-suk Lee, PT, PhD†, Joon-ho Kim, PT, MSc

[1]Department of Physical Therapy, Undergraduate researcher at Eulji University
[2]Department of Physical Therapy, Graduate School of Eulji University

〈Abstract〉

Purpose: The purpose of this study was to aid activities of daily living by investigating the effect of leg width and arm posture on muscle activity of the trunk muscles during Sit To Stand (STS). Also, this study were obtained more objective and accurate values by measuring this with an EMG system.

Methods: All subjects were examined the variation in muscle activity of erector spine, gluteus maximus, with four STS actions (CBS, OBS, CWS and OWS). The change of muscle activity was measured based on the predominant side identified through the pre-survey questionnaire of the subjects. Maximal Voluntary Isometric Contraction (MVIC) was performed to normalize muscle activity values. After that, Standing and sitting were performed 3 times every 7 seconds for each experiment posture and the average value except the first and last 2 seconds of each posture was used.

Results: In result, erector spinae muscle activity showed significant increase in the OBS posture (p<0.05). There was no significant difference in the muscle activity of gluteus maximus in all postures (p>0.05).

Conclusion: During the performance of the STS operation, the OBS posture will be useful to increase the muscle activity of erector spinae. The outcome of this study is expected to be a reference for effective STS posture to modern society live in people.

Key Words: Sit To Stand, Leg width, Arm posture, Muscle activity

† 교신저자: 이한숙, E-mail: leehansuk21@hanmail.net

편마비 환자(hemiplegia patient)의 어깨 통증 및 관절가동범위증가에 발란스 테이핑이 미치는 영향: 사례 연구

손영진 · 이정훈[1†]

동의대학교 보건의과학과, [1]동의대학교 물리치료학과

The effects of balance taping on hemiplegia patient's shoulder pain and range of motion: case study

Young-Jin Son, PT, Jung-hoon Lee, PT, PhD[1†]

Department of Biomedical Health Science, Graduate School, Dong-Eui University
[1]Department of Physical Therapy, College of Nursing, Healthcare Sciences and Human Ecology, Dong-Eui University

〈Abstract〉

Purpose: The purpose of this study is to investigate the effects of balance taping on right hemiplegia patient's shoulder pain and restricted range of motion.

Methods: Balance taping was applied for 3 weeks on the shoulder and the lower arm of a hemiplegia patient with pain and restricted range of motion in the shoulder. Changes in shoulder pain and range of motion was measured after application of balance taping.

Results: After application of balance taping, the right shoulder pain decreased from VAS 4 to VAS 1. The flexion range of the shoulder joint increased from 95 to 160 degrees.

Conclusion: Application of balance taping on post-stroke hemiplegic patients with shoulder pain and arm weakness would improve both pain and range of motion of the shoulder. Further studies targeting a large number of paraplegic patients should be conducted to determine the effects of balance taping on shoulder pain and weakness.

Key Words : Hemiplegia, Balance Taping, shoulder pain, Range of motion

† 교신저자: 이정훈, E-mail: dreampt@hanmail.net

발목 외번 테이핑이 만성 뇌졸중 환자의 보행능력에 미치는 즉각적인 효과

신영준 · 김명권[1†]

대구대학교 물리치료학과, [1]대구대학교 물리치료과

Immediate effects of ankle eversion taping on gait ability of chronic stroke patients

Young-jun Shin, PT, MS, Myoung-kwon Kim, PT, PhD[1†]

Department of Physical Therapy, Daegu University
[1]Department of Physical Therapy, Daegu University

〈Abstract〉

Purpose: The purpose of this study is to assess the immediate effects of applying ankle eversion taping using kinesiology tape in patients with foot drop after stroke..

Methods: In this study, fifteen subjects with stroke underwent three interventions in a random order. Subjects were randomly initially assigned to an ankle balance taping, placebo taping, and no taping each group. The ankle eversion taping was used for mechanical correction. Ankle eversion taping is involved in ankle dorsiflexion and eversion. The placebo taping began from both malleolus, and was applied up to the middle point of the lower limb. Gait ability was assessed by the GAITRite System. The measured gait variables are gait velocity, step length, stride length, H-H base support and cadence. All of the measurements were performed immediately after intervention.

Results: Our results showed gait function in chronic stroke patients was improved after ankle eversion taping. Velocity, step length, stride length and cadence under the ankle eversion taping conditions significantly increased (p<0.05) compared to the placebo and no taping conditions. Ankle eversion taping significantly reduced (p<0.05) H-H base support compared to the no taping condition.

Conclusion: We conclude that the application of ankle eversion taping that uses kinesiology tape instantly increased the gait ability of chronic stroke patients with foot drop. However, more research is necessary to identify the long term effects of the ankle eversion taping.

Key Words: Ankle eversion taping, Stroke, Gait

† 교신저자: 김명권, E-mail: skybird-98@hanmail.net

스위스볼을 이용한 안정화 운동이 머리전방자세에 미치는 영향: 슬링과의 비교

곽수빈 · 기대근 · 김주완 · 김현호 · 문선애 · 박민희 · 오지혜 · 이동우†

호남대학교 물리치료학과

Influence of stabilization exercise swiss ball on forward head posture, comparison with sling excercise

Su-bin Kwak, Dae-geun Gi, Ju-wan Kim, Hyun-ho Kim, Seon-ae Mun, Min-hee Park, Ji-hye Oh, Dong-woo Lee†

Department of Physical Therapy, Honam University

〈Abstract〉

Purpose: This study evaluates c.v angle, muscle thickness, and ROM changes of people with forward head posture through stabilization exercise using Swiss balls and slings. The study demonstrates that stabilization exercise using Swiss balls are as effective as those utilizing slings.

Methods: 15 university students attending Gwangju H University were randomly divided into two groups of Slings (n=8) and Swiss Balls (n=7). The exercise took place 3 times a week for 30 minutes for the duration of 4 weeks.

To measure cv angle changes, the posture grid and x-ray were used. The change in muscle thickness was measured using ultrasound waves. Before and after each exercise sessions, the changes in measured values were determined. Data collected was analyzed through SPSS 21.0.

Results: The thickness of CV angle and longus colli before and after exercise changed meaningfully.

And though the thickness of SCM was reduced in both groups, but the changes were not statistically significant ($P > 0.05$).

There was no significant statistical difference between the two groups(swiss ball, sling), although Only a few measure in ROM were some changes in the mean values.

There was no statistical difference between the two groups of results ($P > 0.05$).

Conclusion: The Swiss ball exercise is also as effective In FHP as the sling exercise. Moreover, it has higher utility, for the exercise is not limited by the locations .

Key Words: Swissball, sling, FHP, CV Angle, ultrasound, muscle thickness change, ROM, SCM, Longus colli

† 교신저자: 이동우, E-mail: lee740904@naver.com

체질량지수, 체지방률, 하지근육량이 동적 균형능력과 정적 균형능력에 미치는 영향

김소희 · 박윤지 · 이선정 · 황현화 · 이현민†

호남대학교 물리치료학과

Effects of Body Mass Index, Body Fat Percentage, and Lower Limb Muscle Weight on Dynamic Balance and Static Balance Ability

So-hee Kim, Youn-ji Park, Seon-jeong Lee, Hyeon-hwa Hwang, Hyun-min Lee, PT, PhD†

Department of Physical Therapy, Honam University

〈Abstract〉

Purpose: This study was conducted to investigate the effect of BMI, body fat percentage, and lower limb muscle weight on the dynamic balance and the static balance ability of the women in their twenties.

Methods: Twenty-six normal adult women were assessed with the Inbody examination, and then their stability balance was checked with the stability limit test and their static balance ability with the standing on one foot.

Results: The body fat percentage and the lower limb muscle weight were statistically signigicant for the dynamic balance ability. However, the body mass index, the body fat percentage, and the lower limb muscle weight were all not statistically significant for the static balance ability.

Conclusion: It was confirmed that the increased body fat had a negative effect on the dynamic balance ability while the increased muscle mass had a positive effect on the dynamic balance ability.

Key Words: Body Mass Index, Body Fat Percentage, Lower Limb Muscle, Dynamic balance, Static balance

† 교신저자: 이현민, E-mail: leehm@honam.ac.kr

엎드린 자세에서의 엉덩관절 폄 운동시 큰볼기근과 넙다리근막긴장근의 근 활성도 비교

조윤호 · 이한숙[1†] · 이원빈[1] · 황원경[1]

[1]을지대학교 물리치료과

Comparison with muscle activity Gluteus Maximus and Tensor Fascia Latae on Prone Position

Youn-ho Cho, PT, Han-suk Lee, PT, PhD[1†], Won-bin Lee, PT[1], Won-kyung Hwang, PT[1]

Department of Physical Therapy, Eulji University
[1]Department of Physical Therapy, Graduate School of Eulji University

〈Abstract〉

Purpose: the purpose of this study was to investigate the influence of hip abduction angle on the Muscle Activity amplitude of the Gluteus maximus and Tensor Fascia Latae during prone knee flexion with hip extension exercise.

Methods: The subjects of this study were 20 healthy person. They were perform exercise, using prone hip extension with knee flexion in two hip abduction position 0° and 30°. every participant agree with consent. Data software was used by Noraxon MR-XP 1.08 Master Edition, and we used SPSS 18.0 for statistical analysis. EMG data was calculated by volume per second. It was average amplitude, each angle and muscle. Each data was processed by Mann-whitney test. there is four group. first group was TFL muscle in hip abduction 0°, second group was TFL muscle in hip abduction 30°, third group was GM muscle in hip abduction 0°, fourth group was GM muscle in hip abduction 30°. We compared first group with second group, for see the trend of TFL muscle activity, and compared third group and fourth group, for see the trend GM muscle activity.

Results: GM amplitude was greatest in the 30° hip abduction position($p<0.05$), followed by 0° hip abduction during the exercise. On the other hand, the TFL amplitude was greatest at 0° hip abduction position($p<0.05$), followed by 30°.

Conclusion: According the results of this study, for effectiveness hip extension exercise, hip abduction 30° position was most appropriate position for GM muscle activity.

Key Words: Electromyogram, Gluteus Maximus, Tensor Fascia Latae

† 교신저자: 이한숙, E-mail: leehansuk21@hanmail.net

Rotator Cuff의 강화운동이 제자리 멀리뛰기에 미치는 영향

김가은 · 김슬기 · 김현진† · 김민주

대구한의대학교 물리치료학과

The Effects of Rotator Cuff Strengthing on Standing Broad Jump

Ka-eun Kim, Seul-gi Kim, Hyun-jin Kim†, Min-ju Kim

Department of Physical Therapy, Daegu Haany University

〈Abstract〉

Purpose: The purpose of this study is to be influenced on the standing broad jump by strengthening rotator cuff in male and female college students. 20 college students was the subject of this study.

Method: Check of standing broad jump record using the standing broad jump mat. To strengthen the rotator cuff using Theraband exercise.measurement methods were a standing broad jump. Measurement was set to measure the mean value by one time. Theraband exercise = As per the exercise method, 2 groups each 20 persons were made and were practiced four times a week for 3weeks.

Results: Standing broad jump records no improved after roator cuff muscle strength exercise.

Conclusion: Viewed from the above results, Theraband exercise appear to be noneffective in improving the record of standing broad jump capabilities of students. We thought that if I improved the record of the long jump for arm swing motion more than did not do the arm swing motion, but there was no difference.

Key Words: Arm swing, Rotator cuff, Standing broad jump

† 교신저자: 김현진, E-mail: skdskdwls@naver.com

저주파 전기자극이 팔 골절 후 회복기 환자의 상지 근육 근활성도에 미치는 영향

방현수†

김천대학교 물리치료학과

The Effects of Low Frequency Electrical Stimulation on Muscle activity of Upper Limbs Muscle of Convalescent Patient after arm Fracture

Hyun-soo Bang, PT, PhD†

Department of Physical Therapy, Gimcheon University

〈Abstract〉

Purpose: This study investigated to find the therapeutical effect of low frequency electrical stimulation on the muscle activity of Upper limbs muscle of the convalescent patient after the arm fracture, and it is expected to be used as the necessary data to determine the best muscular contraction condition by the applied stimulated condition in this study.

Methods: This study conducted test based on 4 convalescent patients after arm fracture. The stimulated condition of low frequency was for 30 min/day and 3 days/week using a low frequency electric stimulator at the level of 60Hz and 200Hz and the intensity was applied in the limit that the patients can endure, it was applied for four weeks. The electromyography(Telermyo 2400T G2, Noraxon, USA) was used to measure the muscle activity of the biceps brachii muscle. To examine the difference muscle activity change by the duration, the repeated measured ANOVA was conducted. The significance level α was .05 and used for SPSS 21.0 for windows.

Results: Low frequency electrical stimulation on the change of the muscle activity of the biceps brachii muscle of the convalescent patients after having a arm fracture, it was confirmed that muscle activity significantly increased form after four weeks of treatment. The results of this study were as follows : 1) There were statistically significant difference in pre-test and post-test at peak value. 2) There were statistically significant in two weeks-test and post est at mean value

Conclusion: Theses results showed that the low frequency can be the effective treatment method for enhancing the muscle activity of the weakened upper limbs muscle due to the problem such as the arm fracture etc.

Key Words: Arm fracture, Low frequency electrical stimulation, Muscle activity

† 교신저자: 방현수, E-mail: 76044860@hanmail.net

발목 키네지오 테이핑이 보행속도와 정적균형능력에 미치는 영향

변동현† · 엄수림 · 윤영범 · 이희찬

대구한의대학교 물리치료학과

The Effects of Ankle Kinesio Taping on Walking Speed and Static Balance Ability

Dong-hyun Byun†, Su-rim Eom, Young-beom Yoon, Hee-chan Lee

Department of Physical Therapy, Daegu Haany University

〈Abstract〉

Purpose: The ankle joint strategy plays a very important role in static balance, which has been proved in several studies. However, since most of the studies were performed on patients with nervous system injuries or elderly people, we sought to determine whether the ankle joint strategy support using kinesio taping have an effect on the actual static balance for Normal person with relatively low data.

Methods: In order to see the effect of taping before and after treatment, we measured walking speed and balance ability without taping, and after taping, walking speed and balance ability were measured. The data were analyzed using the SPSS statistics 21 for Windows, and the mean (SD) was calculated and the pre and post-test value was verified by the Paired-T test. All statistical significance levels were set at $p < .05$.

Results: He results of this study are as follow. First, there was no significant difference in walking speed of students before and after taping treatment($p<0.5$). Second, the balance evaluation showed no significant difference in balance ability before and after taping treatment($p<0.5$).

Conclusion: According to the results of this experiment, application of kinesio taping to the ankle joint had no effect on static balance ability and walking speed reduction. Therefore, we propose to study the intervention factors that will have a positive impact on obtaining the stability of the ankle joint strategy in the future.

Key Words: Ankle, Balance, Footmat, Kinesio taping

† 교신저자: 변동현, E-mail: foget797@gmail.com

햄스트링 근력과 유연성에 대한 동적 스트레칭과 20초 정적 스트페칭의 비교

엄진수† · 이창훈 · 라선정 · 손주희

대구한의대학교 물리치료학과

The Effects Dynamic Stretching and 20 seconds Static Stretching on Strength and Flexibility of Hamstring

Jin-su Eom†, Chang-hun Lee, Seon-jeong La, Ju-hui Son

Department of Physical Therapy, Daegu Haany University

〈Abstract〉

Purpose: The aim of this study was to investigate the effects of dynamic stretching and 20 seconds static stretching on strength and flexibility of hamstring.

Methods: Participants were 18 students of Daegu Haany University. They were randomly allocated to two groups: dynamic group and static group. 6RM, sit and reach were assessed before and after three weeks. Variations of 6RM repetition, sit and reach were assessed for three weeks.

Results: The 6RM repetition measured 6 times for three weeks had statistically significant difference in only 2nd post-test within two groups and 1st, 2nd, 3rd, 6th post-test between two groups. The sit and reach measured 6 times for three weeks had statistically significant difference in only 1st post-test within dynamic group and 1st, 3rd, 5th within static group but there were no significant difference between two groups. Compared pre-test with follow-up test, there were statistically significant differences in two groups not between two groups.

Conclusion: Compared with dynamic stretching, 20 seconds static stretching improved strength to similar degree and was more improvement in flexibility.

Key Words: 6RM, Dynamic stretching, Flexibility, Sit and reach, Static stretching, Strength

† 교신저자: 엄진수, E-mail: umjinsue@naver.com

폼롤러를 이용한 장딴지근 근막 이완이 뒤넙다리근 유연성과 장딴지근 단축에 미치는 영향

이가운 · 심준혁 · 전의명† · 이명현

대구한의대학교 물리치료학과

The Effects of Foam Roller Using Gastrocnemius Fascia Release on the Flexibility of Hamstring Muscle and Gastrocnemius Tightness

Ga-woon Lee, Jun-hyuk Sim, Ui-myeong Jeon†, Myung-heon Lee

Department of Physical Therapy, Daegu Haany University

〈Abstract〉

Purpose: It can be seen that the fascia of the hamstring and Gastrocnemius are connected when the knee is extened. This hypothesis is based on the hypothesis that relaxation of the fascia of the Gastrocnemius affects the flexibility of the hamstring. If this hypothesis is established, the patient with the hamstring injuries becomes better through the Gastrocnemius treatment indirectly. And if there is a shortening of the Gastrocnemius, the effect of the relaxation of the fascia on the shortening can be seen. The purpose of this study is to find out the effect of relaxation of the fascia on the shortening of the Gastrocnemius.

Methods: A total 20 college students were tested. The flexibility of the hamstring was measured in the sitting position with stretch the arms, and the both ankles were measured with the knee is flexed and extened. Then, in the lying position, divide the gastrocnemius into four parts, perform fascia relaxation massage using a foam roller, measure again, and compare the values.

Results: Flexibility of the hamstring compared with that before and after the test. On the average, the flexibility was increased by 4.5($p < .05$) and there is the significant difference.

The result of mesuring of the angle of GCM. On average, the left side was decreased by 6.9($p < .05$) and the right side was decreased by 2.8($p > .05$). We can see that the length of both side is better than before but the right side have no significant difference.

Conclusion: We could see that the flexibility of the hamstring can be increased by the relaxation of the fascia of the GCM when the direct treatment of hamstring is impossible due to the injury, When the case of shortening of the GCM, it is require the measurement

Key Words: Foam roller, Gastrocnemius, Hamstring

† 교신저자: 전의명, E-mail: poten331@gmail.com

슬링을 이용한 요부 안정화 운동방법에 따른 몸통근육의 두께 비교

강린유 · 김용진 · 김진희 · 최정훈 · 김효진 · 김장곤 · 이상용†

U1대학교 물리치료학과

The Effects of Lumbar Stabilization Exercise Using a Sling on the Thickness of Trunk muscles

Rin-you Kang, Yong-jin Kim, Jin-hee Kim, Jung-hun Choi, Hyo-jin Kim, Jang-gon Kim, PT, PhD, sang-yong Lee, PT, PhD†

Department of Physical Therapy, U1 University

〈Abstract〉

Purpose: The objective of this study is to provide basic information for the rehabilitation of lumbar stabilization by comparing the changes of lumbar stabilization muscles thickness after lumbar stabilization exercise using mat and sling.

Method: The subjects of this study were 15 healthy adults who studied at Chungbuk U1 University. The exercises consisted of four different kinds of exercises; to raise arms and legs off the mat at four-leg crawling posture (Exercise 1), to raise different arms and legs at the holding sling and prone posture with coxa (hip joint) and knee joint stretched and (Exercise 2), to raise different arms and legs holding sling at four-leg crawling posture (Exercise 3), to reach both hands about 10cm forward holding sling in both hands at prone posture, keeping center of gravity stretching stifle (knee joint) and coxa (hip joint)(Exercise 4). During exercise, ultrasonic system was applied to measure changes of muscle thickness in oblique muscle, inside oblique muscle, and transverse abdominis. In order to investigate the muscle thickness change of each muscle according to the exercise methods, the post event verification was performed by Feroney Correction Method.

Results: As a result of measuring the muscle thickness according to four different exercise methods, there was a significant difference in Exercise 2 and Exercise 4 according to the exercise methods ($p<0.05$).

Conclusion: In order to increase the muscle strength of each muscle effectively, it is necessary to perform different selective exercises depending on the muscle types in order to strengthen muscle power.

Key Words: Transverse abdominal, Trunk Stabilization, Ultrasonography imaging

† 교신저자: 이상용, E-mail: lsy8275@u1.ac.kr

치매여자노인과 정상여자노인의 뇌활성도 차이

한동욱†

신라대학교 물리치료학과

The differences of brain activation between the normal elderly women and the demented elderly women

Dong-wook Han, PT, PhD†

Department of Physical Therapy, Silla University

〈Abstract〉

Purpose: This study investigated the potential of quantitative electroencephalogram (EEG) analysis for dementia diagnosis by examining the correlation between each frequency band of EEG using a sample of normal and demented elderly women.

Methods: Thirty-three elderly women (17 normal, 16 demented) without history of brain disease were participated in this study. EEGs of the subjects were measured continuously for 5 minutes while subjects' eyes were closed. The AT index was defined as the ratio of the theta wave to the SMR wave; the AC index was defined as the ratio of the low beta wave to alpha wave; and the ST index was defined as the ratio of the high beta wave to the alpha wave. The differences in brain activity between normal and demented elderly women were analyzed using the Mann-Whitney test and the SPSSWIN (ver. 12.0) program.

Results: All areas showed a lower AT index among normal elderly women compared to demented elderly women. In the P4 area, the AC index and the ST index were significantly higher in normal than in demented elderly women, indicating there is a difference in brain activity between normal and demented elderly women.

Conclusion: These results show that quantitative EEG analysis can be used for dementia diagnosis.

Key Words: Quantitative EEG, Dementia diagnosis, Brain activity

† 교신저자: 한동욱, E-mail: dwhan@silla.ac.kr

발 내재근 강화가 균형에 미치는 영향

홍승지† · 한지혁 · 석우진 · 박선아 · 박시현

대구한의대학교 물리치료학과

The Effects of Foot Type on Balance Ability According to Supporting Surface

Seung-ji Hong†, Ji-hyeok Han, Woo-jin Seok, Seon-a Park, Si-hyun Park

Department of Physical Therapy, Daegu Haany University

〈Abstract〉

Purpose: Effects of a strength exercise training for foot intrinsic muscle (extensor digitorum brevis/ abdudctor hallucis/ flexor digitorum brevis/ flxor hallucis brevis/ adductor hallucis) to balance in aged 20's.

Methods: Thirty adults, aged 20-26 yrs, exercise training group (TR: M=10 F=10/ one female and one male with an injured ankle were excluded from the experiment. ∴M=9 F=9) and control group (CON: M=5 F=5). Homogeneity test results were obtained between experimental group and control group. In TR performed an exercise program developed to increase strength of foot intrinsic muscle five sessions/week for three weeks, whereas subjects in CON were asked to maintain their normal life pattern during the same treatment period.

Results: The area is a sway range. The wide area means that the balance is swayed too much, which means the balance is not good. The area average value of the area decreased after the intervention of the man and the woman increased after the intervention. The man's exercise training group showed a significant improvement in balance but not in female's exercise training group.

Conclusion: The man's exercise training group showed a significant improvement in balance but not in female's exercise training group. So, we suggest to experiment with more variety of samples and various exercises.

Key Words: Balance, Intrinsic Foot Muscles, Strengthening

† 교신저자: 홍승지, E-mail: ghdtmdwl8172@naver.com

건측 상지 운동 제한 치료가 경직성 편마비 뇌성마비 아동의 손 기능에 미치는 영향

방현수†

김천대학교 물리치료학과

The Effects of Constraint-Induced Movement Therapy on Hand Function in Child with Spastic Hemiplegic Cerebral Palsy

Hyun-soo Bang, PT, PhD†

Department of Physical Therapy, Gimcheon University

〈Abstract〉

Purpose: The aims of this study was to investigate the effects of constraint induced movement therapy(CIMT) on the affected upper extremities function for a children with spastic hemiplegic cerebral palsy.

Methods: The participants of this study are 6 children with spastic hemiplegic cerebral palsy aged between 5 to 8 years old. During the CIMT period, the unaffected hand of the subjects was restrained by a hand splint for 6 weeks, five days per week, five hours a day. And the affected upper extremity was strongly trained by performing functional tasks, which were individually structured use of the affected arm. Measurements used to assess hand function are Grooved Pegboard Test(GPT), and Jamar Grip Strength Test(JGST). The Grooved Pegboard Test(GPT) and Jamar Grip Strength Test(JGST) were performed repeatedly every two weeks.

Results: After the CIMT, there was a significant improvement in completed time for Grooved Pegboard Test(GPT)($p<.05$). The time taken for the subject to do the Grooved Pegboard Test(GPT) was shorten during the therapy period and this effect was maintained after the therapy. However, there was no significant difference in the Jamar Grip Strength Test(JGST) between the treatment and post-treatment phase.

Conclusion: The results of this study provided some evidences to support therapeutic effect of the constraint-induced movement therapy on the hand function for a child with hemiplegic cerebral palsy. For future research, it is recommended to examine various periods and protocol of modified CIMT including impact of long periods application.

Key Words: Constraint induced movement therapy, Hand function, Cerebral palsy

† 교신저자: 방현수, E-mail: 76044860@hanmail.net

바로 누운 자세에서 상지 등척성 수축이 정상 성인의 반대측 몸통근의 활성도에 미치는 영향

김도연 · 이남주 · 이아현 · 이상용†

U1대학교 물리치료학과

The Effects of Isometric Upper Limb Contraction on the Activation of Contralateral Trunk Muscles in Healthy Young Adults in Supine Position

Do-yeon Kim, Nam-ju Lee, A-hyun Lee, Sang-yong Lee, PT, PhD†

Department of Physical Therapy, U1 University

〈Abstract〉

Purpose: To investigate the effect of the trunk's muscular activity on the contralateral side according to the movements of the dominant upper limb when lying down in a supine position.

Method: The experiment was carried out on a sturdy 20s adult studying at Chungbuk U University. The subject was instructed to lie down in a supine position, spread his feet as wide as his shoulders, and keep his toes in a neutral position. By maintaining this anatomical posture, he carried out the starting posture and was instructed to maintain this position until the end of the experiment. For the measurement of muscular activity during the isometric contraction in the starting posture, an EMG device was used for the abduction, adduction, flexion, and extension of the shoulder joints. In order to measure the isometric contraction of the upper limb, an isometric contraction pressure meter was used to obtain the maximum isometric contraction force of each trunk movement. For all measurements, the subject was instructed to extend his posture, and the measurements were conducted again when another target action came up. For 5 seconds, the contraction was set once. This was repeated 3 times and the subject was allowed to rest for 5 minutes between each exercise.

Result: The isometric contraction of the abduction, adduction, flexion, and extension of the shoulder joints showed significant differences in the muscular activity of the muscle rectus abdominis of the contralateral trunk, internal oblique, erectorspine, and multifidus ($p<0.05$). Post-analysis results show that the muscular activity of the muscle rectus abdominis, internaloblique, erector spine, and multifidus significantly increased in the closing and bending movements, as compared to the extending and opening movements ($p<0.05$).

Conclusion: The isometric contraction of the dominant upper limb due to adduction and flexion movements has an effect on the muscular activity of the contralateral trunk.

Key Words: Controlateral trunk, Isometric, Muscle activit

† 교신저자: 이상용, E-mail: lsy8275@u1.ac.kr

정중신경 손상 평가를 위한 전류지각역치의 유용성

손영민 · 한동욱[1†]

유유병원 물리치료실, [1]신라대학 물리치료학과

The availability of current perception threshold for the evaluation of median nerve injuries

Young-min Son, PT, MS, Dong-wook Han, PT, PhD[1†]

Department of Physical Therapy, YuYu Silver Hospital
[1]Department of Physical Therapy, Silla University

〈Abstract〉

Purpose: This study compared the results of EMG and a neurometer test and examined the kinds of sensory fibers for which nerve damage may be objectively evaluated in an attempt to provide the basic materials with which to develop an evaluation method incorporating these two tests.

Methods: The subjects were individuals who visited an EMG laboratory of a general hospital in Busan with the cardinal symptom of hand tingling and who underwent a sensory nerve conduction study and then neurometer current perception thresholds (CPT). The present study used sensory NCVs of the finger-wrist and palm-wrist segments. The A-β fiber, A-δ fiber, and C fiber thresholds were measured by sequentially applying stimulation at the frequencies of 2000 Hz, 250 Hz, and 5 Hz, respectively.

Results: The thresholds for nonmyelinated C fibers were higher in the abnormal group than in the normal group.

Conclusion: Testing the neurometer current perception thresholds (CPT) for nonmyelinated C fibers first is useful in confirming whether a patient with a complaint of hand tingling has nerve fiber abnormalities.

Key Words: Median sensory nerve conduction velocity, Median nerve injuries, Current perception threshold

† 교신저자: 한동욱, E-mail: dwhan@silla.ac.kr

근피로 유발 후 온습포와 스트레칭이 힘 재현 감각에 미치는 영향

최호규 · 양희준 · 이혜림 · 하가림 · 황태경 · 이상용 · 김장곤†

U1대학교 물리치료학과

Effects of application of hot poultice and stretch after generating muscle fatigue on sense of reproducing physical strength

Ho-gyu Choi, Hui-jun Yang, Hye-rim Lee, Ga-rim Ha, Tae-gyeong Hwang, Sang-yong Lee, PT, PhD, Jang-gon Kim, PT, PhD†

Department of Physical Therapy, U1 University

〈Abstract〉

Purpose: The purpose of this study is to compare the effect of hot poultice for generating muscle fatigue recovery with the effect of stretch. To the test, sense of power reproducing was chosen.

Subject: Participants were 30 adult males, we separated them to hot poultice division 15 people and stretch division 15 people. Mean age and standard deviation of hot poultice division is 21.80±2.2, stretch division is 22.13±2.07.

Method: Generating muscle fatigue using a dynamometer to participants, recovered muscle fatigue through hot poultice and stretch. Also, we compared by measure the sense of reproducing physical strength of generating muscle fatigue before and after.

Results: Hot poultice and stretch both showed a significant recovery on sense of reproducing physical strength. However, there was no difference between the two divisions.

Conclusion: We tried to compare the hot poultice and stretch which can be easily accessed at home using sense of reproducing physical strength test, and there was no significant different between these two.

Key Words: Muscle fatigue, Hot poultice, Stretch, Sense of reproducing physical strength

† 교신저자: 김장곤, E-mail: pedikim@u1.ac.kr

목근육 운동이 알러지성 비염환자의 호흡기능에 미치는 영향

하미숙 · 한동욱[1†]

춘해보건대학 물리치료과, [1]신라대학교 물리치료학과

The effect of cervical muscle exercise on pulmonary functions in allergic rhinitis

Mi-sook Ha, PT, PhD, Dong-wook Han, PT, PhD[1†]

Department of Physical Therapy, Choonhae College of Health Sciences
[1]Department of Physical Therapy, Silla University

〈Abstract〉

Purpose: This study assessed the effect of stretching and strengthening exercises for the cervical muscles on the respiratory gas transport system in allergic rhinitis patients.

Methods: The research subjects were those who had been diagnosed with allergic rhinitis by an otorhinolaryngologist and had at least one distinctive symptom such as sneezing, rhinorrhea, nasal obstruction, or pruritus whose severity level was higher than mild according to the diagnostic criteria test of ARIA (allergic rhinitis and its impact on asthma). After sufficiently explaining about the research to the subjects before the experiment, the experimental group carried out three sets of stretching exercises for the sternocleidomastoid and scalene and strengthening exercises for the upper trapezius and suboccipitals ten times a day for five days a week with the aim of rectifying muscle imbalances. Respiratory gas was analyzed after eight weeks of exercises using a wireless metabolic measurement system (K4b2, Cosmed, Italy). The independent t-test and paired t-test were used to compare respiratory gas results.

Results: Tidal volume (Vt), oxygen uptake (VO2), carbon dioxide emission (VCO2), minute ventilation (VE), breathing frequency (BF), and heart rate (HR) significantly increased after the experiment in experimental group, while respiratory parameters did not significantly change in the control group except for VE.

Conclusion: A combination of postural and breathing exercises were effectively rectified muscle imbalances and posture in the experimental group as measured by changes in cardiopulmonary function.

Key Words: Allergic rhinitis, Cervical muscle exercise, Respiratory gas

† 교신저자: 한동욱, E-mail: dwhan@silla.ac.kr

저항운동시 팔꿉관절 각도변화가 팔꿉관절 굴곡근의 근활성도에 미치는 영향

강태욱 · 한동욱[1†]

워크재활의학병원 물리치료실, [1]신라대학교 물리치료학과

The effects of angle changing of elbow joint on the elbow flexor muscle activation in resistive exercise

Tae-wook Kang, PT, MS, Dong-wook Han, PT, PhD[1†]

Department of Physical Therapy, Walk Rehabilitation Hospital
[1]Department of Physical Therapy, Silla University

〈Abstract〉

Purpose: This research shows the effect of angular variation of flexion at the elbow joint on the muscle activation of elbow flexor muscles.

Methods: The research participants were 24 male college students with their prior written consent that their non-dominant hand were left, they had no surgical or neurological disorders and they had already known the method and purpose of this study. The subject's shoulder joint stayed at resting position, and the elbow joint was given the angle variation of 55°, 70°, and 90°. The angle between pulley with weights and forearm stayed at 90°. Surface electromyogram was used in measurements, three attempts for measurement at each degree were made for average value, and every time the degree changed, two minute recess was given.

Results: The muscle activation of elbow flexor affected by angular variation of flexion at the elbow joint showed a noticeable change. The muscle activation of elbow flexor between the angles of elbow joint showed less difference between 55° and 70° at biceps brachii. The muscle activation between the angles of biceps brachii and brachioradialis showed angle-related changes in order of 55°, which showed the biggest change, then 70° and 90°.

Conclusion: In order to improve muscle strength of the elbow flexor through the pulley system, it seems more effective to make the 90° angle between pulley with weights and forearm when the muscle is stretched to a length 20% greater than its resting position.

Key Words: Pulley with weight exercise, joint angle, muscle activation

† 교신저자: 한동욱, E-mail: dwhan@silla.ac.kr

정중신경가동술 적용 방법이 정중운동신경전도속도에 미치는 영향

하미숙 · 손영민[1] · 한동욱[2†]

서울유병원 물리치료실, [1]유유요양병원 물리치료실, [2]신라대학교 물리치료학과

The effects of applying methods of median nerve mobilization on median motor nerve conduction velocity

Mi-sook Ha, PT, MS, Young-min Son, PT, MS[1], Dong-wook Han, PT, PhD[2†]

Department of Physical Therapy, Seoul You Hospital
[1]Department of Physical Therapy, YuYu Silver Hospital
[2]Department of Physical Therapy, Silla University

〈Abstract〉

Purpose: This study examines the difference in nerve conduction velosity (NCV) between two groups; in one group, a physical therapist applies manual nerve mobilization (MNM) to the subjects, and in the other group, the subjects receive training and practice self-MNM for themselves. Based on the experiment, the therapeutic basis of MNM is examined, and the usefulness of home teaching is tested.

Methods: Twenty healthy female college students without symptoms or signs of peripheral neuropathy were the subjects. The subjects in both groups confirmed NCV of median nerve through a median motor nerve conduction test before the experiment. While keeping the elbow joint and wrist joint extended, MNM continued for 15 second, followed by a 10 second break. This was repeated three times.

Results: In the wrist-elbow section, NCV increased for the MNM group and did not significantly change for the self-MNM group. NCV rose for the MNM group and fell for the self-MNM group. For the elbow-axilla section, NCV increased for the MNM group and did not significantly change for the self-MNM group. NCV rose for the MNM group and fell for the self-MNM group.

Conclusion: The analysis results showed that a physical therapist's application of MNM was more effective than self-MNM in increasing nerve conduction velocity.

Key Words: Median nerve mobilization, Self-median nerve mobilization, Median motor nerve conduction velocity

† 교신저자: 한동욱, E-mail: dwhan@silla.ac.kr

정상여자노인과 여자대학생의 뇌활성도 비교

한동욱†

신라대학교 물리치료학과

Comparative Analysis of Brain activation between Healthy Elderly Women and healthy female university students

Dong-wook Han, PT, PhD†

Department of Physical Therapy, Silla University

〈Abstract〉

Purpose: This study determined the differences in the brain activation between healthy elderly women and healthy female university students.

Methods: Twenty-seven healthy elderly women (75.89±6.44 years) who could independent daily living with no history of brain diseases such as stroke or schizophrenia and 27 healthy female university students (22.11±2.04 years) who are studying at S university in Busan were as participants in this study. Examinations used twenty electrodes attached to the head to capture electrical brain signals during brain activated states such as the awaked state and the data were compared between the two groups. The AT index is the ratio of theta waves and SMR waves. The AC index is the ratio of alpha waves to low beta waves. The ST index is the ratio of high beta waves to alpha waves. The Mann-Whitney test was conducted to examine changes in EEG.

Results: Fp1, Fp2, Fz, F3, F4, F7, F8, and Pz areas indicate a significantly lower AT index in the healthy elderly women than in the healthy female university students. The Fp1, Fp2, Fz, F3, F4, F7, F8, Pz, P3, and P4 areas all showed a significantly higher AC index in the healthy elderly women. And also the healthy elderly women had a significantly higher ST index than the healthy female university students in the Fz, F3, F4, F8, Pz, P3, and P4 areas.

Conclusion: We confirmed that the brain activation of the healthy elderly women higher than the healthy female university students for processing information which is received during eyes closed. This means that the rest of brain in the elderly women was lack. We also demonstrated the capability of the quantitative EEG in the examination of cognitive impairments.

Key Words: Quantitative EEG, Healthy elderly women, Healthy female university students

† 교신저자: 한동욱, E-mail: dwhan@silla.ac.kr

치매진단에 유용한 뇌지수 개발

한동욱†

신라대학교 물리치료학과

Development of a Brain Index for Dementia Diagnosis

Dong-wook Han, PT, PhD†

Department of Physical Therapy, Silla University

〈Abstract〉

Purpose: In this study, proposed and existing brain indexes derived from quantitative EEG analysis were compared in dementia cases and healthy subjects, to verify their clinical applicability in the diagnosis of dementia.

Methods: The subjects of this study were 23 elderly women suffering from dementia and 18 elderly women without dementia, who consented to voluntary participation in this study after being informed of its purpose. There were two kinds of brain indexes used in this study. The first type was already in use and includes the attention (AT) index, the activation (AC) index, and the stress (ST) index. The second type of brain index, proposed by the author of this paper, comprises of the drowsiness (DS) index, the thinking (TK) index, and the complication (CP) index.

Results: There were significant differences between the AT index and the TK index between two groups in Fz, Fp1, and Fp2 of the prefrontal lobe. However, F3, F4, F7 and F8 of the frontal lobe, showed significant differences only in the AT index. For Pz, P3 and P4 of the parietal lobe, there were significant differences between the AT index and the DS and TK index between two groups.

Conclusion: The results show that a brain index for detecting dementia in a more accurate and objective way is needed, and that the development of a new brain index is feasible.

Key Words: Brain Index, Quantitative EEG, Brain activation

† 교신저자: 한동욱, E-mail: dwhan@silla.ac.kr

당뇨환자의 연령별 신경섬유 퇴화 시기

한동욱†

신라대학교 물리치료학과

Nerve fiber degeneration time according to the age in diabetic patients

Dong-wook Han, PT, PhD†

Department of Physical Therapy, Silla University

〈Abstract〉

Purpose: This study was performed to discover the possible onset time of diabetic neuropathy by age of diabetic patients, and to provide the knowledge necessary for preventing or managing diabetic neuropathy.

Methods: The subjects of this study were outpatients who visited D Hospital Department of Neurology with complaints of significant neuropathic symptoms including dullness, numbness and paraesthesia. Stimulations of 5 Hz, 250 Hz and 2,000 Hz were generated with a Neurometer CPT (Neurotron Inc., Baltimore, MD, USA) and delivered selectively to C fibers, A-delta fibers and A-beta fibers. The intensity of the stimulations of 5 Hz, 250 Hz and 2,000 Hz was incrementally increased as much as 0.01 mA.

Results: The results of this experiment show that the period of retrogression of nervous fibers was different significantly according to the age of patients with diabetes mellitus. Especially, in the case of individuals in their 50's, Aβ, Aδ, and C fibers in both the right and left lower limbs significantly changed within a period of 2 months. In the case of individuals in their 60's, Aβ and C fibers of the right lower limb meaningfully changed 2 months after the onset of the disease, and Aβ, Aδ, and C fibers of the left lower limb also significantly changed within a period of 2 months.

Conclusion: We discovered that patients suffering from DM especially in their 50's or 60's should be thoroughly followed for their condition, right from the onset of DM, in order to prevent the retrogression of nervous fibers.

Key Words: Diabetes mellitus, Nervous fiber, Neuropathy

† 교신저자: 한동욱, E-mail: dwhan@silla.ac.kr