

제 17회 대한물리의학회
추계학술대회 및 정기총회

물리치료의
임상적 접근과 적용

▣일시 2019. 9. 28(토) 13:00~18:00

▣장소 고려대학교 하나과학관(서울)



제 17회 대한물리의학회 추계학술대회 및 정기총회 일정 및 세부사항

물리치료의 임상적 접근과 적용

○ 일 시 : 2019년 9월 28일(토요일) 13:00~18:00

○ 장 소 : 고려대학교 하나과학관

○ 일정표

시 간	프 로 그 램	비 고	
12:30~13:00	참가자 등록	재무이사	
13:00~13:10	개회식	학회장	
	session 1. 논문발표	학술이사	
13:10~14:00	The effect of the calf muscle fascia relaxation using the foam roller on the flexibility of the Hamstring muscle and the shortening of the calf muscle	심준혁	
14:00~14:10	휴식시간		
	session 2. 특강	학술이사	
14:10~16:00	특강 1	Fascia and FDM	정준섭
	특강 2	물리학 환자관리 6단계	배성수
	특강 3	미세전류의 치료적 접근	정영춘
16:00~16:20	휴식시간		
	session 3. 물리치료 연구를 위한 기초	학술이사	
16:20~17:00	연구윤리 관련 특강	노효련	
17:00~18:00	정기총회 및 폐회식	사회자, 회장 진행	

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개회사

존경하는 회원여러분, 풍성한 수확의 계절에 회원여러분들의 학문적 성과의 장을 우리나라 물리치료의 근간인 고려대학교 하나과학관에서 가지게 됨을 무척이나 기쁘게 생각합니다

일산 배성수 명예회장님께서 학회를 발족하신 이래 현재까지 역대 회장님, 임원진 및 회원 모두의 열정과 노력으로 대한물리의학회는 명실상부한 우리나라 물리치료계의 중심 학회로 발전하게 되었습니다.

최신 물리치료적 소견들에 대한 끈임없는 탐구를 통하여 지금보다 더 체계적이고 과학적인 근거를 마련하는 학회가 되도록 최선을 다할 것입니다.

물리치료사법 추진 등과 함께 신생 학회들이 그들의 학문적 영역을 넓히고 주도해나가기 위해 쉽없이 도전해 오고 있는 것이 현실입니다. 대한물리의학회도 한단계 업그레이드를 위해 편집위원장을 비롯한 임원들이 국제적인 수준으로의 학회지 격상을 위해 영문판 회수를 증가하는 등 다양한 준비를 하여왔습니다.

이러한 노력과 준비를 토대로 대한물리의학회가 국제적인 수준의 학회지로 발돋움 할 수 있도록 저희 임원진 뿐만 아니라 회원 여러분 모두의 에너지를 모아 주실 것을 당부드립니다.

대한물리의학회 회원 여러분,

본 학회는 물리치료학문의 발전을 위해 앞으로도 끊임없는 노력을 경주할 것이며 회원 여러분의 친근한 학문적 동반자 역할을 성실히 수행하겠습니다. 회원 한분 한분의 목소리에 귀를 기울일 것을 약속드리며, 아낌없는 성원과 참여를 요청합니다.

감사합니다.

대한물리의학회장
이학박사 황보각

논문 발표

The effect of the calf muscle fascia relaxation using the foam roller on the flexibility of the Hamstring muscle and the shortening of the calf muscle

/ Sim jun Hyeok

The effect of the calf muscle fascia relaxation using the foam roller on the flexibility of the Hamstring muscle and the shortening of the calf muscle

Sim jun Hyeok

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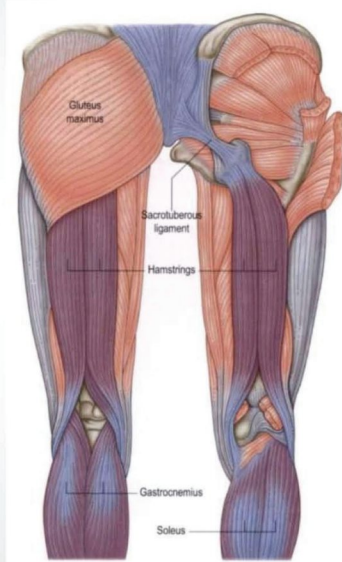
- **Purpose**
- **Methods**
- **Results**
- **Conclusion**

Purpose

Purpose

- **The Hamstring muscles have continuity as the fibrous fascia.**
- **The two heads of the distal Hamstring and the calf muscle are connected to each other by fascia.**
- **When the knee is flexion, the connection between the two muscles is broken, but it acts as one when the knee is extension.**

Purpose



When the knee joint is extension, the two fascias close together and the fascia complex tension and the two fascias function together as if they are holding each other with both wrists.

Purpose

- Pain from direct trauma to the Hamstring muscles prevents the therapist from contacting the affected area using direct massag , Massage to relax the fascia of the calf muscles will affect the flexibility of the Hamstring muscles

Methods

Methods

- **The subjects of this study were 40 university students in Gyeongsan-si without special diseases and diseases.**
- **General characteristics**
- **Age 21.5 (1.5) / Height 167.8 (14.42) / weight 63.48 (21.45)**
- **Randomly assigned**
- **20 experimental groups and 20 control groups.**

Methods



The flexibility of the Hamstring muscle is measured by measuring box in front and extension leg and extension the arm.

Hamstring measured

Methods



The length of the calf muscle is measured with a protractor in the supine position.

Calf muscle measured

Methods

- The experimental group fascia relaxation using a foam roller.
- 4weeks / 3 times a week
- calf muscle into 4 parts
- 2 sets of 5 minutes per site for a total of 40 minutes



Results

Results

- After the experiment, the flexibility of the femoral muscles increased by 4.5cm on average.($p < .05$)

Table 1. Hamstring length paired t-test^a

	Paired Differences ^a					t ^a	df ^a	Sig. ^a
	Mean ^a	SD ^a	SE ^a	95% Confidence interval ^a				
				Lower ^a	Upper ^a			
Before experiment - after experiment ^a	-4.50 ^a	4.61 ^a	1.03 ^a	-6.65 ^a	-2.34 ^a	-4.36 ^a	19 ^a	.00 ^a

Results

- The calf muscle measurement showed an average decrease of 6.9 degrees on the left and 2.8 degrees on the right.($p < .05$)

		Paired Differences ^a					t ^a	df ^a	Sig. ^a
		Mean ^a	SD ^a	SE ^a	95% confidence interval ^a				
					Lower ^a	Upper ^a			
correspondence1 ^a	Left ankle before experiment - Left ankle after experiment ^a	6.90 ^a	10.97 ^a	2.45 ^a	1.76 ^a	12.03 ^a	2.81 ^a	19 ^a	.01 ^a
correspondence2 ^a	Right ankle before experiment - Right ankle after experiment ^a	2.80 ^a	6.84 ^a	1.53 ^a	-.40 ^a	6.00 ^a	1.83 ^a	19 ^a	.08 ^a

Conclusion

Conclusion

- **We confirmed that fascia relaxation of the calf muscles can increase the flexibility of the Hamstring.**
- **Therefore, direct trauma of the Hamstring, it is not possible to treat the Hamstring directly , When direct treatment is not available Indirect treatment seems to be possible**
- **In addition, indirect treatment and research in various ways will be needed.**

Thank you (:



특강 1

Fascia and FDM

/ 정준섭

Fascia and FDM.



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강사 소개



- 정준섭(Maison de physio 대표)
 - 이학박사(대구가톨릭대학교 재활 물리치료전공)
 - DGMSM Manual therapist(독일도수치료학회)
 - Fascia Distortion Model KOREA 회장 겸 강사
 - Neuro fascia integration course 수료
 - FBL functional kinetics수료(Heidelberg)
 - Titleist performance institute Level 1
 - TPI medical level 3(San diego)
 - Certified K-vest-1
 - Certified Boditrak golf ground mechanics
- 전,현
대구보건대학, 대구대학교, 영남이공대학
대구가톨릭대학교 물리치료학과 외래교수
국민대학교, 부산외대, 대전대
TPI 대학원 외래교수

IFAA definition.

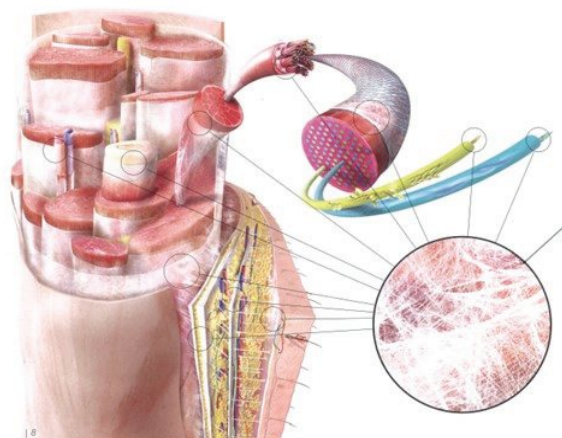
- International Federation of Associations of Anatomists
- IFRC: International Fascia Research Congress(Carla stecco, 2015)



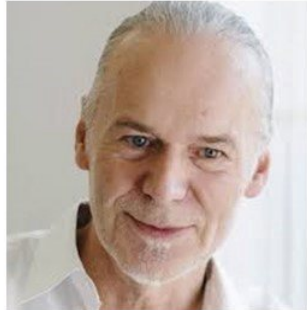
Fascia.

Subdivisions of Fascia

1. Superficial Fascia (hypodermis, tela submucosa, or subcutis)
2. Deep Fascia (fascia profunda)
3. Epimysium (perimysium and endomysium)



Robert Schleip & Thomas Findley.



“근막은 인체내 최대의 결합 조직으로 모든장기(organ), 근육 (muscle), 뼈(bone), 신경조직(nerve)을 연결하고 둘러싸는 막”

“섬유로 된 모든 조직: 널힘줄(aponeurosis), 인대(ligament), 힘줄 (tendon), 지지대(retinacular), 관절주머니(joint capsule), 장기 (organ), 혈관(vessle)

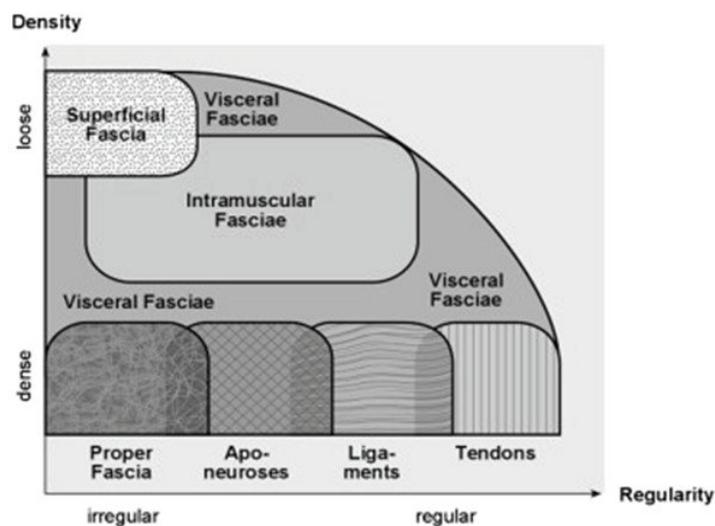


Fig. 0.3 • Different connective tissues considered here as fascial tissues

Fascia: The Tensional Network of the Human Body. Elsevier Health Sciences.

“근막이라는 결합조직이 없으면 인체는 존재 할 수도 없고, 형성될 수도 없다는 것을 인식해야 한다.”

Jean-Baptiste Lamarck

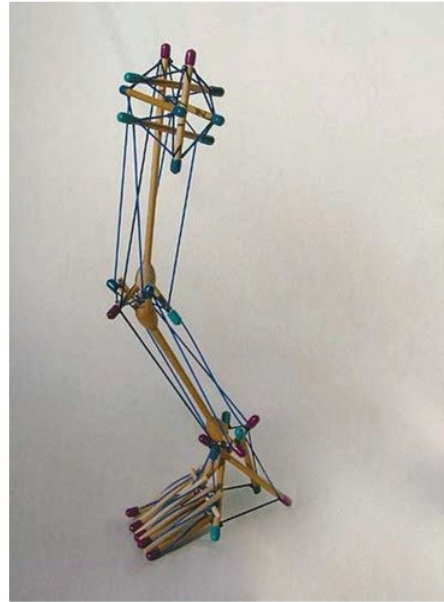


Portrait by J. Pizzetta, 1893

Tensegrity.



Biotensegrity.

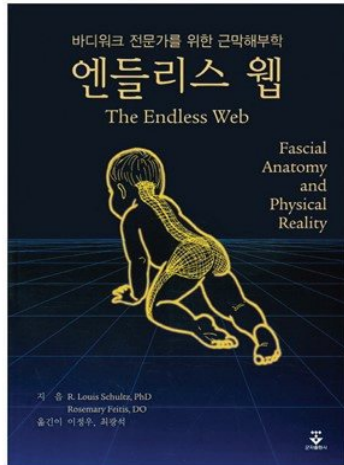


Facial net.(Andry vleeming)



'Fascia is your soft skeleton'
(Vleeming 2011)

Endless web.



Thixotropy(요변성).

- Describes the change of a material in its viscosity (getting softer, more fluid) through pressure / shearing forces and the return to its original state afterwards, such as Ketchup (shake), synovial fluid (warm up) or the miracle of Januarius (Naples).



Ketchup is a good example of a thixotropic substance. It does not flow even when the bottle is held upside down.



However, when the bottle is struck (vibrated), the ketchup temporarily liquefies and flows.



Once the vibration stops, the ketchup returns to its original viscous state.

Fascia의 구분(location).

- Superficial fascia(얇은 근막)
- Deep fascia(깊은 근막)
- Meningeal fascia(뇌막의 근막)
- Visceral fascia(내장 근막)

Superficial fascia(얇은 근막).

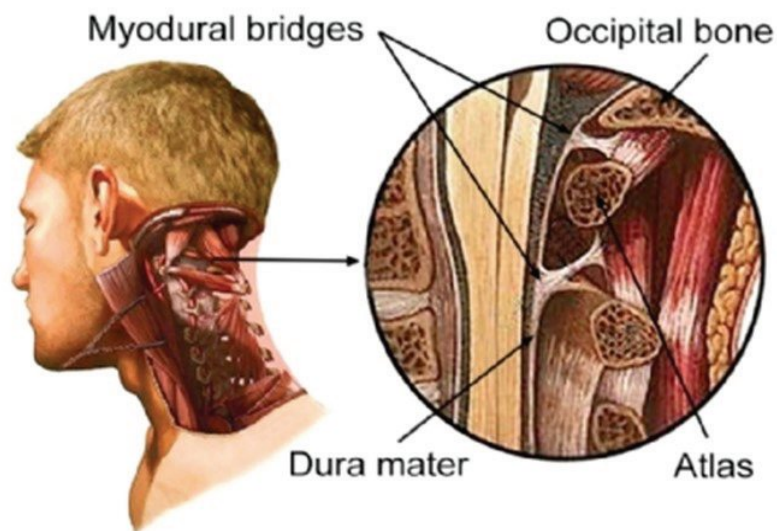
- Shock-absorber Function
- Protective Function
- Transport Function

Deep fascia(깊은 근막).

- Transmission of Power and Stability
- Transport Function

Meningeal fascia(뇌막의 근막).

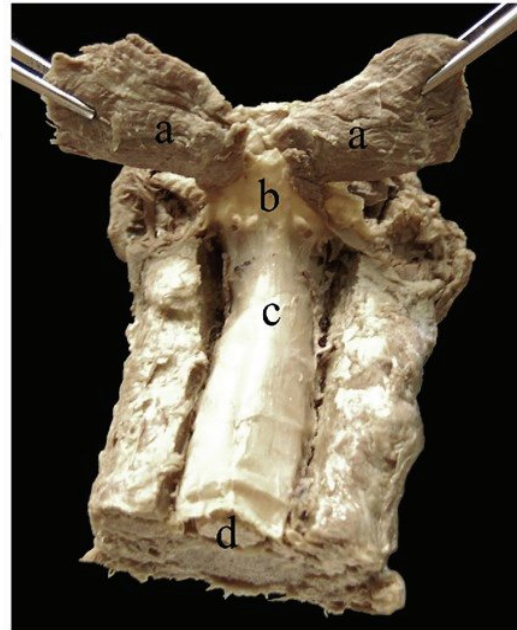
- 근막은 발생학적으로 중배엽에서 시작



Myodural bridge.

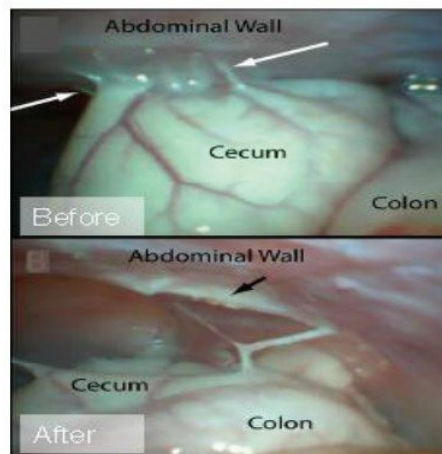
- connecting body to brain

Fig. 2. Image of a cervical spine laminectomy revealing the dural attachment between the rectus capitis posterior major (RCPma) muscles and the cervical dura mater. Rectus capitis posterior major (a), attachment between the cervical dura mater and the RCPma (b), dura mater of the spinal cord (c), and spinal cord (d) at the level of the fifth cervical vertebrae.



Visceral fascia.

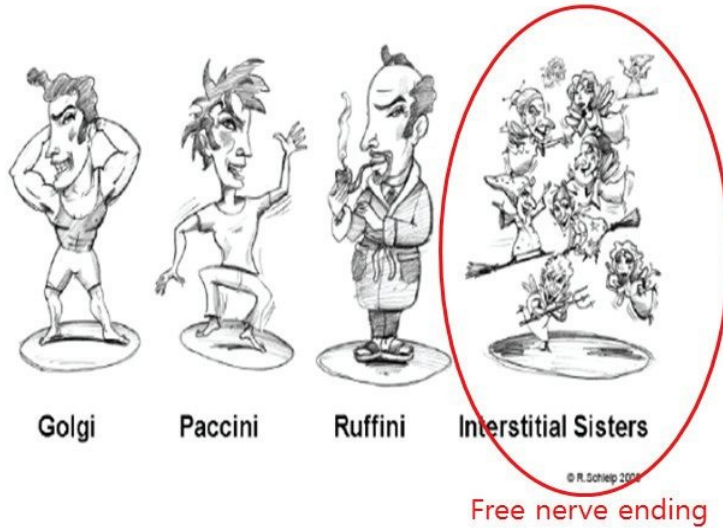
- Carrier function



Sensory organ.

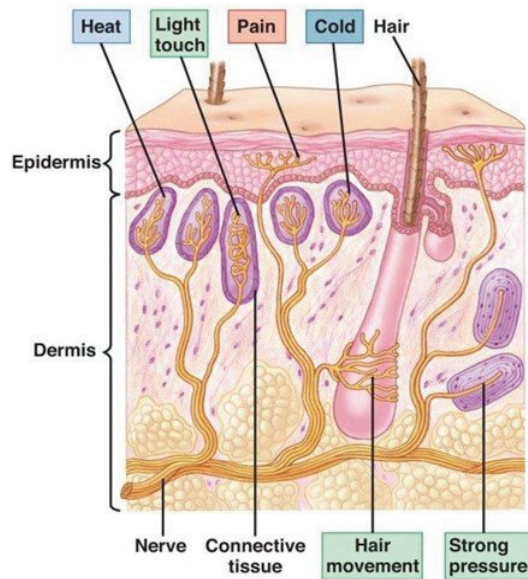
The 4 Types of Fascial Mechanoreceptors

- and how to work with each member of this Italian family in a different style



Free nerve endings.

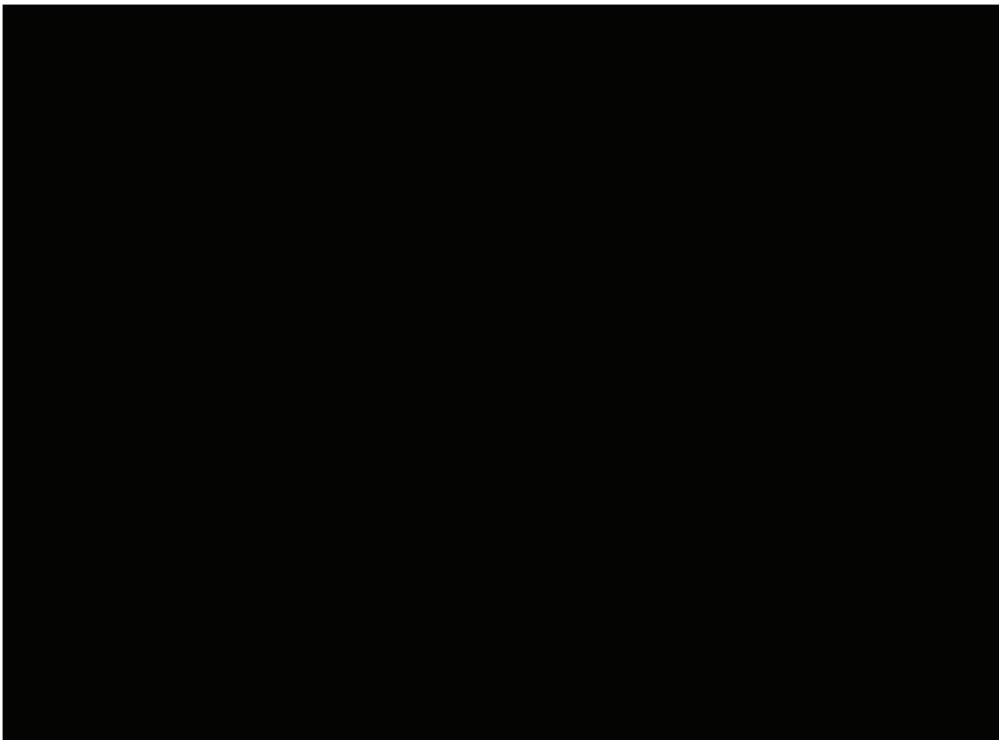
- 우리 몸의 약 80% 감각 정보 받음



- 근막의 비정상적인 긴장으로 과도하게 활성화된 자유 신경 종말이 만성 통증의 원인(Stecco 등. 2013)
- 내리막길 걷기를 시행한 참가자를 대상으로 초음파를 이용해 고농도 생리식염수를 근육 그룹과 근막 그룹에 주입 실험(Gibson 등. 2009)
- 등허리근막과 허리세움근의 생리식염수 주입 비교에서도 근막이 통증 감각에 더 민감하다는 것을 발견 (Schilder 등. 2014)

➔ “우리 몸은 근막의 비정상적인 변화에 따라 통증 인지”

Underscope.



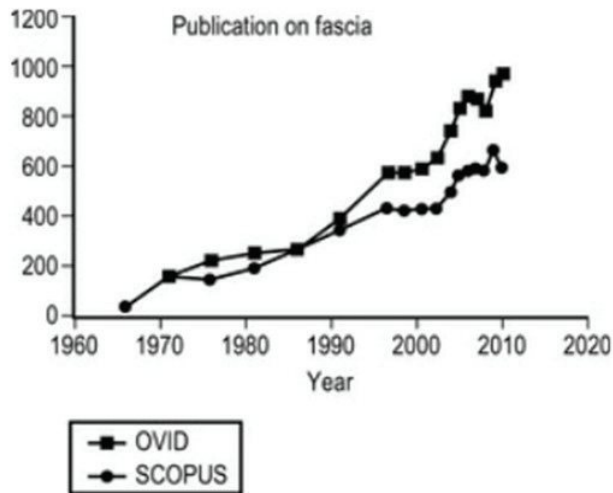


FIG. 0.1 • Number of peer reviewed scientific papers

What is FDM?

Fascial Distortion Model

Dr. Stephen Typaldos D.O.
 US American Osteopath
 Medical Doctor in the Europe
 (1957- 2006)

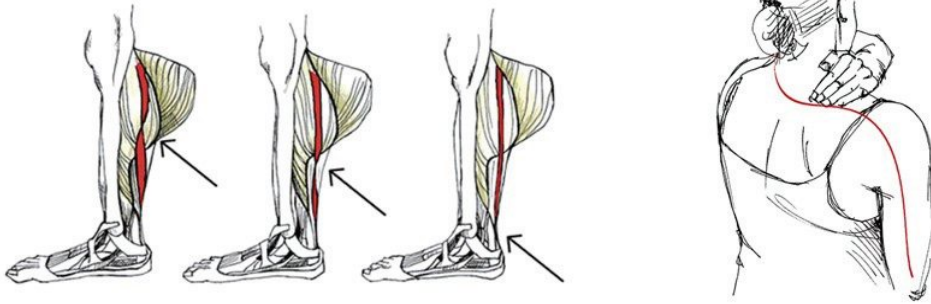


Typaldos discovered the first fascial distortion, which he called a trigger band, in September 1991 in Yuba City

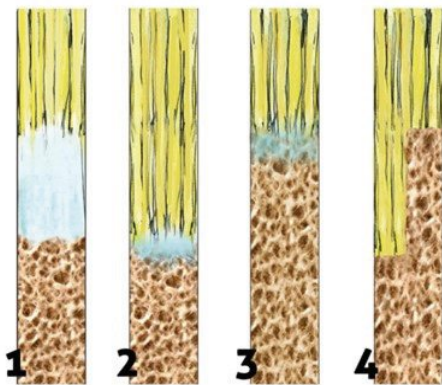
6-fascia distorsion model.

- 1. Triggerband (TB)

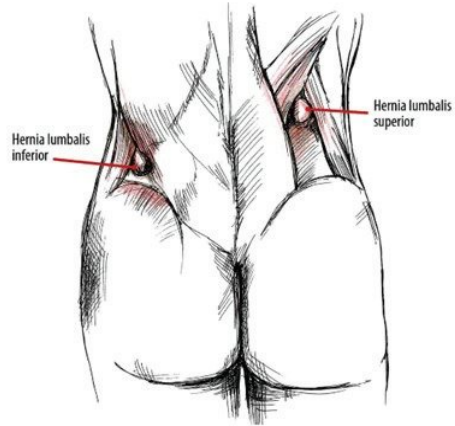
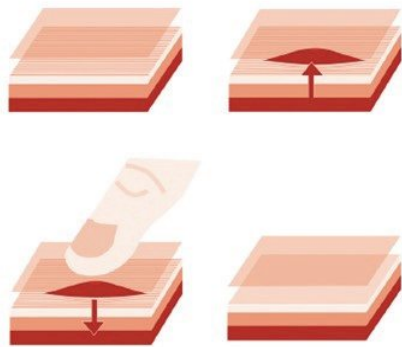
Distorted Triggerband in the lower leg and the distal "untwisting."



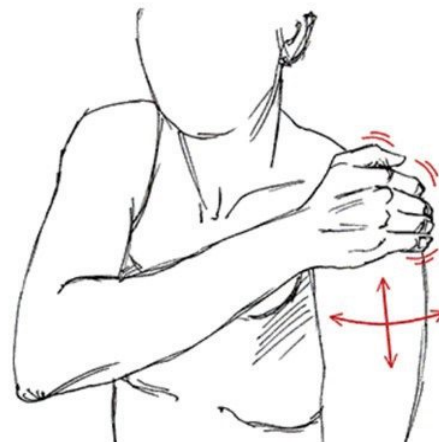
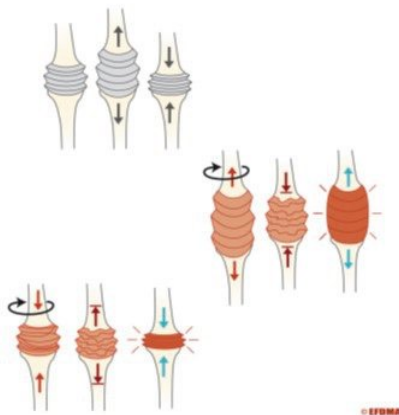
- 2. Continuum Distortion (CD)



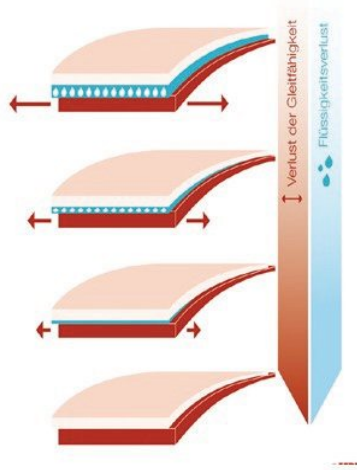
- 3. Herniated Triggerpoint (HTP)



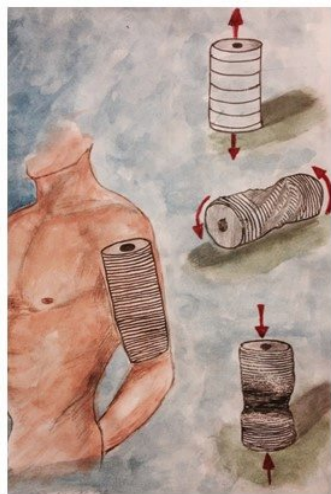
- 4. Folding Distortion (uFD, rFD)



- 5. Tectonic Fixation (TF)



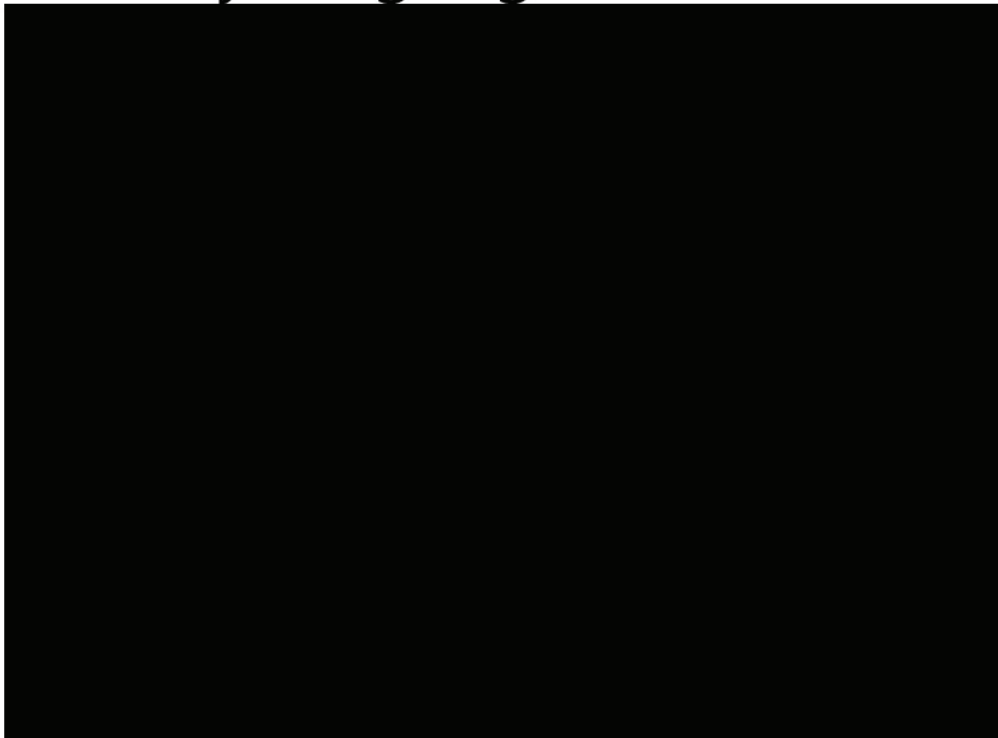
- 6. Cylinder Distortion (CyD)



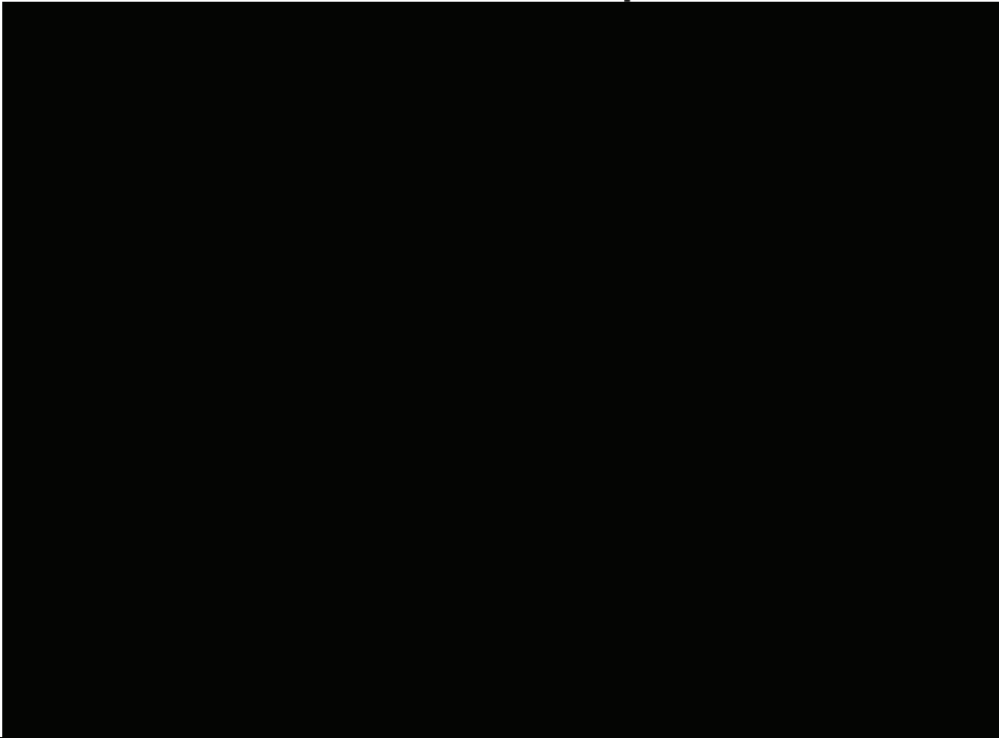
6-fascia distorsion model.



Body language-Treatment.



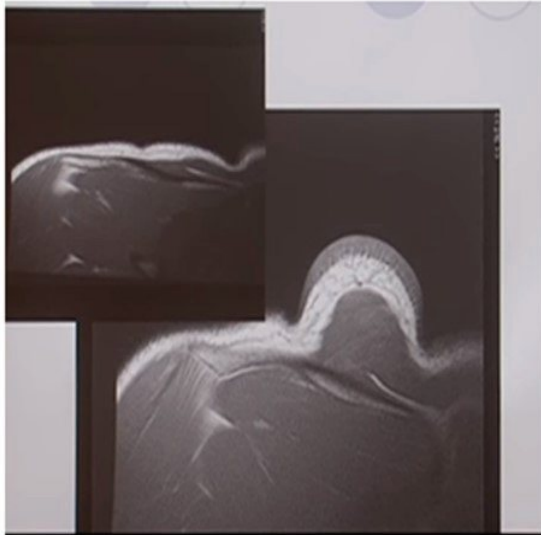
FDM therapist.



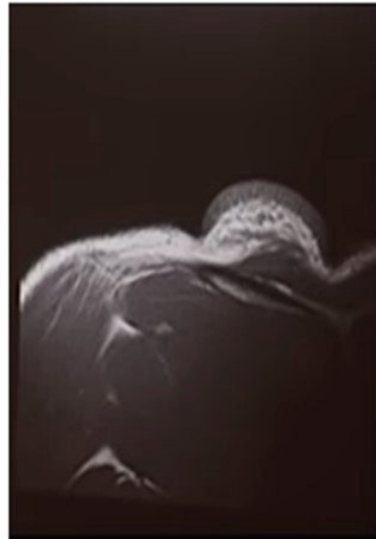
Cupping 적용 사례 (phelps)



MRI-cupping



Shoulder-posterior



Cupping 30 minutes later

적용 사례 (PGA tour player)



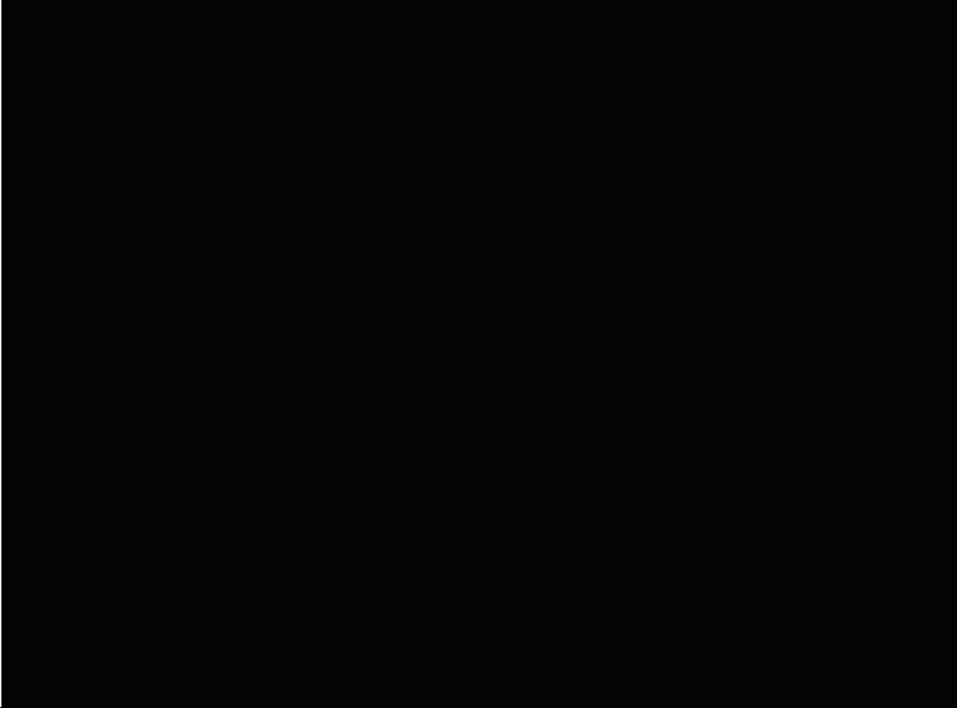
적용사례(exercise with cupping-MLB Player)



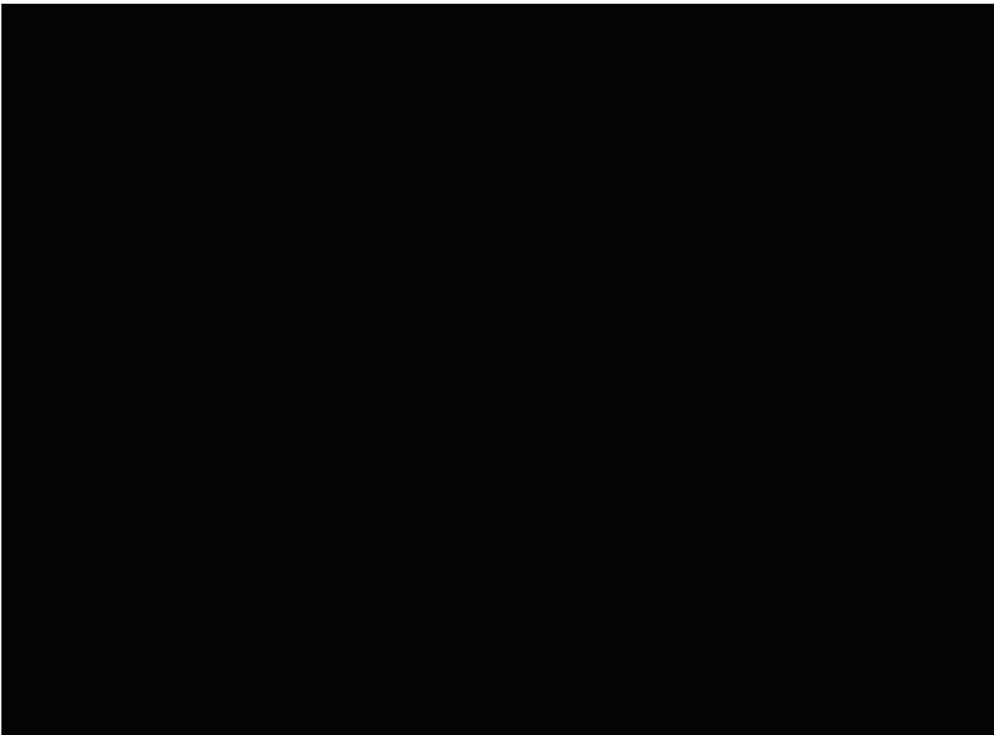
적용사례(sue falsone)



Treatment case-1



Treatment case-2



Treatment case-3

- 서울 FDM hip&knee course 동영상

FDM KOREA!!

Facebook : **FDM Academy Korea**
Daum cafe : FDM Academy Korea
Naver band : FDM Academy Korea

fdmkorea@hanmail.net

- 이종경 간사:010-9778-7048
-가능하면 문자나 카톡으로 문의 바람

특강 2

물리학 환자관리 6단계

/ 배성수

물리의학 환자관리 6 단계

대구대학교 명예교수
배 성 수

용어사용

- Physical medicine: Dr. Frank H. Krusen(1938)
- Physical medicine and rehabilitation: Dr. Howard A. Rusk(1949)
- Division of Physical Therapy(USA), X. Department
- Division of Biokinesiology and Physical Therapy(USC)

musculoskeletal, orthopedic, cardiopulmonary, endocrinology, sport medicine, geriatrics, pediatrics, wound care, electromyography, neurological rehabilitation, women's health, fitness, health & wellness, laboratory & imaging studies, physical examination

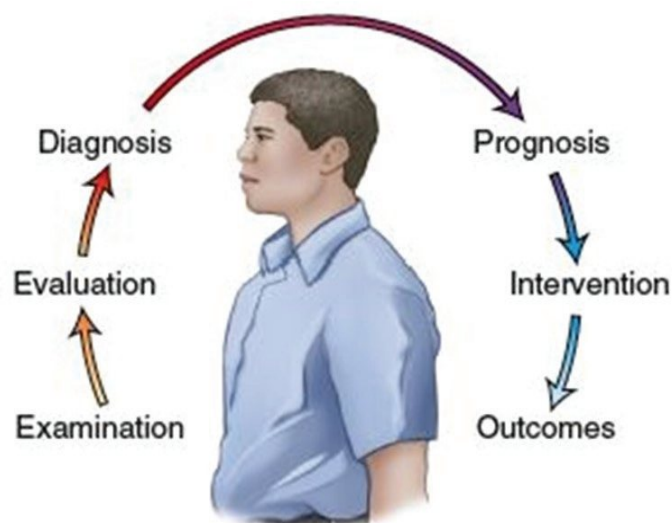
물리치료학→측정 및 평가, (진단, 검사, 치료, 예후)

물리의학(physical medicine)→진단, 검사, 치료, 예후(물리치료사 윤리 강령 마지막 조; 물리의학의 발전을 위해.....)

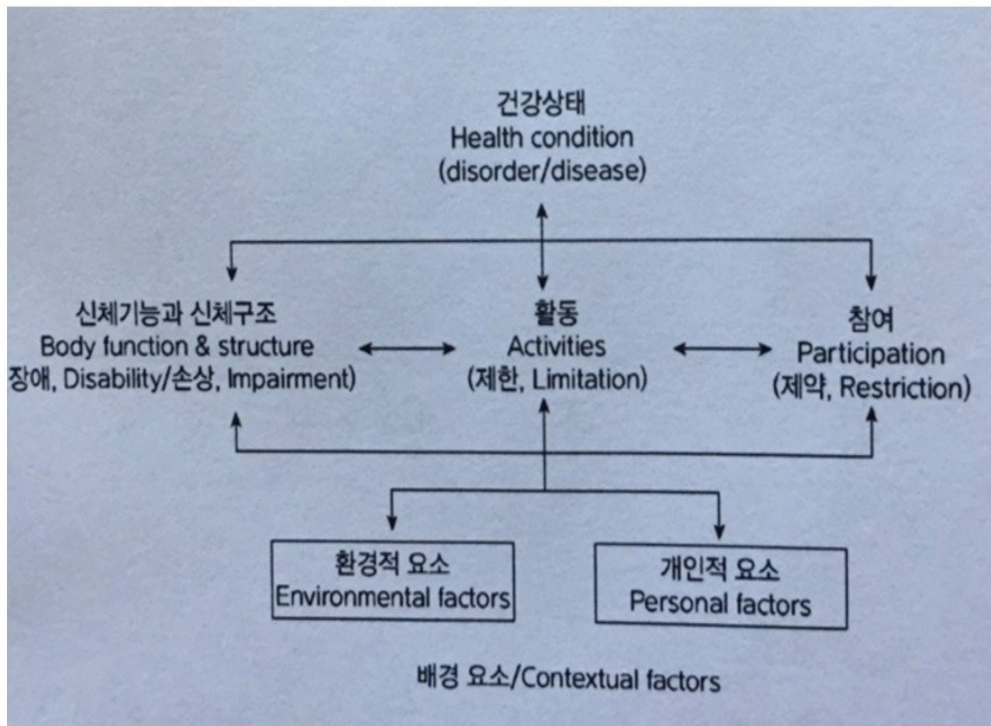
APTA 환자관리의 발전

- SOAP Note(1960년대).
 - Patient / Client management model 6 step(2000년대 이후).
- *Examination ; history, system review.
*Evaluation ; test & measure.
*Diagnosis ; function & structure, activity & participation.
*Prognosis ; plan of care, long term & short term goal.
intensity, number, set etc.
*Intervention ; treatment plan.
*Outcome ;

APTA 6 step(2000년대 이후)



Diagnosis by ICF framework(2001)



ICF 구조(틀, framework)

Diagnostic level

Diagnosis

*function & Structure(F&S)

Disability & Impairment

(장애 & 손상)

*Activity(A)

Limitation(제한)

*Participation(P)

Restriction(제약)

*Environmental factor & Personal factor

*물리치료 선진 국가에서 환자 presentation은 ICF framework.

물리의학 임상 6 단계 / clinical physical medicine 6 step with ICF framework

• 1단계; 정보 수집과 분석

의사의 처방, ICF cord(d4501), EMR, 병력, 취미, 직업(등).

*2단계; 문진(치료목표 설정), 시진, 촉진(청진, 타진) / examination / system review

호흡기계, 순환기계, 피부계, 근육 뼈대 계, 신경계, 인지, 의사소통 등).

*3단계; 진단 및 예후(diagnosis & prognosis) with ICF framework.

Top-down approach / activity and participation level / "SMART test on A&P"

활동수행력 검사, 문제목록작성, 문제목록검증.

*4 단계; 임상 프로그램 계획(intervention, treatment) with ICF framework.

Bottom-up approach, Provide evidence-based practice.

*5 단계; 치료(F and S, A and P).

*6 단계; 재검사(outcome).

제1단계; 정보 수집과 분석

• 환자정보.

• ICF 코드(예; d4501;장거리 걷기,1km이상 걷기 d4502;다양한지면 걷기, d4503;장애물 걷기 / d5400;옷 입기, d5401; 옷 벗기).

• 의사의 처방전(의사의 진단; 뇌졸중, Lt. hemi).

• 의무기록(electronic medical record, EMR).

• 병력.

• 과거치료, 복용정보.

• 의사, 간호사 등의 다른 전문가 의견.

• 직업, 취미, 주거상태, 가족관계.

• 영상정보, 병리검사소견(등).

제2단계; 문진, 시진, 촉진, 청진/system review

- 계통적 관찰(system review); 1)심혈관 / 호흡; 혈압, 부종, 심박동수, 호흡율. 2)피부; 유연성, 흉터여부, 피부색갈. 3)근골격; 가동범위, 근력. 4)신경근육; 협응과 운동기능. 5)의사소통능력, 의식, 지남력(사람, 시간, 장소 등).
- 문진; 1)무엇을 원하는가(치료목표)? 2)증상(통증)? 3)질병의 이해도(병상태, 예후의 파악 정도)? 3)주위환경,가족관계? 4)일상 생활활동(지역활동, 취미 등)?(등).
- 시진; 부종, 위축, 형태(대칭과 비대칭), 자세와 체형, 호흡형태, 보행, 균형(등).
- 촉진(청진, 타진); 1)수동검사, 능동검사, 저항검사. 2)피부온도, 부종, 피부결 확인. 3)민감통, 압통, 발통점, 염발음. 4)경직도 (등)
- 청진: 1)폐음의 청진, 2)심음의 청진(등)

제2단계; 문진시 상황파악을 위한 절차적 요소

- 오늘 무엇이 불편해서 오셨습니까(치료목표가 될 수 있다)?
- 어떤 증상이 있습니까? 통증? 강직? 관절의 불안정?
- 증상이 갑자기 발생? 서서히 발생?
- 그전에도 증상이 발생한적? 치료경험? 치료결과?
- 어떤 활동이 증상을 일으킵니까? 어떤 활동이 증상을 완화?
- 증상(통증)이 지속적? 간헐적? 통증은 어떤 형태?
- 통증 때문에 할 수 없는 활동? 통증 때문에 복용 약 있습니까?
- X-ray, MRI등을 찍었습니까?

제3단계; 진단과 예후(top-down approach)

- ICF모델 활동수준(activity)에서 진단(환자가 원하는 것); 잘 걷고 싶다. 옷 입고 벗기를 잘 하고 싶다. 일어나 앉고 싶다. 계단을 오르내리기를 하고 싶다.(등)
- 진단명 붙이기; 걸기제한(limitation)이 있다. 일어나 앉기 제한이 있다. 계단 오르내리기 제한이 있다. 구르기 제한이 있다. 옷 입고 벗기 제한(limitation)이 있다(ICF framework).
- 제한(limitation)을 확인하기 위한 검사.
- 활동수행력 검사를 한다 / SMART한 검사 / top-down approach
"S"(specific); 검사가 현재 환자에게 적합한가?
"M"(measurable);수치화, 정량화가 가능한가? 국제적 통용 단위 사용(시간,거리,단위 시간당횟수). 국제적 공인된 검사 인가?
"A"(achievable); 달성가능한가?
"R"(relevant); 당면문제와 관련성이 있는가?
"T"(time); 검사시간은 어떤가(5~6분). www.rehabmeasur.org
Allmeasur or www.strokengine.ca/an/find-assesment

제3단계; 진단과 예후(계속)

- 환자가 잘 걷고 싶다(치료목표);TUG혹은 10m걸기 검사를 할 수 있다.
- TUG결과 40초(고령자10초 이내 정상, 13.5초 이상 낙상위험도).
- 왜? 문제목록작성; 어떤 기능(function),구조(structure)와 관련?
1)근력, 2)가동범위, 3)통증, 4)유착(근섬유, 활막주머니, 건 등), 5)경직, 6)구축, 7)폐활량감소, 8)인지장애, 9)감각장애, 10)지구력감소 (등).
1~10항 모두일수도 있고, 1~5까지 해당 될 수 도 있다.
MMT, ROM, VAS, MAS, MMSE, 2점 검사(등).
- *문제목록 검증
- *검사결과; MMT=45%, ROM=F(60%), VAS=7, MAS=-1
- *진단; 활동수준에서 걸기 제한(limitation)이 있다/ TUG=40초
기능과 구조수준/기능장애와 구조손상(검사결과)이 있다.
- *예후;F&S/근력강화,가동범위증가 경직감소 등으로 약 4주 필요.
A&P/ TUG; 20초(2주 예상).
단기, 장기목표설정 / 치료회수, 치료강도, 치료빈도, home program.

제3단계; 진단과 예후(계속)

- 치료목표; 잘 걷고 싶다 / Lt. Hemi
 - 활동(activity)참여(participation)수준 / TUG or 10m 걷기검사;
- | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> *강점목록(positive list) 1.선 자세 유지. 2.Rt.상하지 이용가능. 3.대화가 가능. 4.걸을 수 있다. 5.보조장비 사용. 6.정신상태 양호. 7.치료 동기부여 양호. 8.가족참여 양호(등). | <ul style="list-style-type: none"> *문제목록(problem list, hypothesis) 1.선자세가 구부정 하다. 2.자세가 뒤틀려있다. 3.보행이 불안정 하다. 4.보행 시 몸통 회전이 없다. 5.유각 보폭이 짧다. 6.중간 입각기가 짧다. 7.절름거리다. 8.보행 속도가 느리다(등). |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

제3단계; 진단과 예후(계속)

- 치료목표; 잘 걷고 싶다 / Lt. hemi
 - 신체기능(function)신체구조(structure)/
MMT, ROM, VAS, MAS, MMSE (등)
- | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> *강점목록(positive list); 1.정신기능 양호.
(의식, 지남력, 주의력). 2.Rt. 감각양호. 3.Rt. 근 골격 기능양호. 4.MMT, ROM 양호. | <ul style="list-style-type: none"> *문제목록(problem list); 1.정신기능; 인지장애, 치료참여부족 2.감각통증;(Rt.무릎,어깨통증) 3.Lt.심부 감각 장애 4.Lt.근력감소, 가동범위감소, 5.Lt. 상하지 중등도 경직(등). |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

제4단계; 치료 프로그램 계획

• Bottom up approach

MMT=45%, ROM=F(60%), VAS=7, MAS=-1

• F&S수준에서 치료계획;

- 1)근력증가;ROM을 한다. PNF하지패턴+기법, 싯투스탠드(등).
- 2)ROM증가;ROM, PNF패턴+수축-이완기법,신장운동,관절가동(등)
- 3)통증감소;PNF패턴+유지-이완기법, 냉찜질, 간접치료(등).
- 4)경직감소;PNF패턴,유지-이완기법,얼음 타올,reinforcement이용.

*A&P수준에서 치료계획;

- 1)걸을 때 몸통과 양하지, 팔다리의 협응; 매트 활동, 매트↔서기,매트와 하이매트에서 스쿠팅(scooting)(등).

제4단계; 치료프로그램계획(계속)

2)싯 투 스탠드를 훈련한다.

- (1)매트에서 일어서기를 한다.
 - (2)하이 매트에서 일어서기를 한다.
 - (3)높이가 다른 의자로 옮겨가며 앉기와 서기를 한다.
 - (4)형태가 다른 의자로 옮겨가며 앉기와 서기를 한다.
- 3)평지, 경사면, 장애물 걷기를 한다(CPG템포를 적용한다).
- 4)계단 오르내리기를 한다(앞으로,옆으로,뒤로,한발씩,양발교대로)
- 5)비탈길, 모래 길, 자갈길 걷기를 한다.
- 6)축구공을 가져와 공차기(오른발, 왼발, 톱킥, 사이드킥 등).
- 7)복도에서 치료사와 드리볼 하기. 혼자 드리볼 하기 (등).

제5단계; 치료하기

- 제4단계 치료프로그램계획을 그대로 적용 한다.
- 제4단계 치료프로그램계획 중 선택해서 적용 한다.
- 먼저 F&S 수준에서 치료한다(bottom-up approach).
다음 A&P 수준에서 치료한다(top-down approach).

*치료 시에는 Bottom-up approach와 top-down approach를 섞어서 할 수도 있다.

제6단계; 재검사(out comes)

- 제3단계 진단과 예후에서 한 A&P수준에서 한 똑 같은 검사를 한다.
 1. 즉 TUG를 해서 결과를 기록한다(만약 28초가 되었다).
 2. 이 결과를 제3단계 진단 시 기록과 비교한다.
 3. 40초에서 28초로 단축되었다. 결과를 환자,보호자와 공유한다.
 4. 홈 엑스사이즈를 제공한다.
 5. 홈 엑스사이즈는 F&S, A&P 수준에서 한 치료를 하나씩 선택하는 것이 좋다.

*제3단계에서 한 F&S수준의 검사는 필요 시, 1~2주 후, 혹은 3~4주 후 검사하여 비교한다.

특강 3

미세전류의 치료적 접근

/ 정영춘

미세전류의 치료적 접근

미세전류 치료의 전망

2

통증치료

- 그동안 진통제가 많이 쓰였다.
- 항상 부작용이 문제였다.

미세전류치료 · 부작용 없는 통증치료 개발의 연구 결실

연구 발전 과정

3

- 1860년**
 - 남북전쟁 당시 뒤부아레이몽(Dubois-Reymond)
 - 상처전류와 전위측정으로 미세전류의 새장을 열었다
- 1900년대초**
 - 구미에션 개발과 응용이 시작되던 시기
- 1934년**
 - 미국 의학협회(AMA)에서 비과학적이라고 선언하였다.
 - 이후 잠시 주춤 하다가
- 1965년**
 - 캐나다 로널드 맬작(Ronald Melzack)
 - 영국 패트릭 웰(Patrick Wall)
 - 관문조절설(Gate Control Theory)를 발표하여 전기생리 분야의 연구에 일조가 되었다.

관문 조절설

4

- 통증신호가 척수관문 메커니즘을 거쳐야하며
 - 관문 메커니즘이 통증신호를 올리거나 내릴수 있다고 주장한 것이다.
- 이 이론은**
1. 아픈곳을 쓰다듬어 주면 통증이 좀 약해지는 거와 같은 궁금증을 풀어 주었다.
 2. 전기생리분야의 연구증진 시킨.
 3. 약물대신 통증 조절 목적의 TENS 류의 치료기가 양산 보급되어 지금까지 쓰이고 있다.
- 1970년**
 - 미국 o/s Dr. Robert Becker
- 1976년**
 - 러시아 침술 전기공학자 Kasa sev
- 위 두사람의 연구내용과 업적은 미세전류의 반석을 만들어주었다.

미세전류 치료기기의 내용

5

- 9~12v 건전지를 사용
- 출력은 10~100 μ A 이며
- 주파수는 0.5, 1.5, 100Hz 등을 사용
- 사용되는 파형은 사각형 파형

왜 통증이 치료 되는가?

6

- 인체에는 (모든생명체) 생체 전류가 흐르고있다.
- 통증이 생기는 기전?
 1. 조직세포에 damage를 받게되면 그부위는 전기저항이 높아진다
 2. 생체 전류의 절대 전류량 감소로 염증 반응 유발 (통증, 국소발열, 부종)
 3. 근육조직은 생리적수축 현상 (혈류량감소, 영양, 산소공급, 배설등 저하)

이러한 결과들이 염증과 통증을 야기 시킴

미세전류가 통증을 치료하는 기전?

7

- 인체의 고유전류 = 생체전류(bio-current) = 미세전류(micro current)
- 상처 부위에 생체전류의 공급(충전효과)의 원리 이다.

상처 부위에
전류량이 많아지면

1. 전기저항 감소
2. 생체전기의 흐름이 좋아지고
3. 본래의 상태로 회복되는 것

이것을 생화학적 측면에서 분석

8

1. ATP를 500% 증가
2. 단백질 합성 촉진 조직 세포와 폭발적인
3. 세포막 투과성 촉진 신진대사가 촉진됨
4. DNA의 합성 촉진
5. T 임파구의 활성화 촉진

ATP(adenosine triphosphate)란?

1. 모든 생명체의 Energy 원이다.
2. 음식물 섭취 후엔 최종적으로 ATP 형태로 저장

ATP는 Energy가 필요되는 곳에 쓰임

1. 생체반응
2. 세포 구성 성분 생산
3. 근육운동 등에 쓰이고 있음
4. 신경전달
5. 수많은 생명현상 기능

ATP

9

- 조직에 ATP 가 많아지면
- 염증이나 통증 부종등이 조절되고 치료됨
- 왕성한 신진대사와 함께 면역성이 강화됨
- * 현재 통증치료에 사용되고있는 전기 자극 치료기들과는
치료내용이 전적으로 다르다.

MENS 비교

10

	TENS,ICT 체외 충격기 등	MENS 미세전류치료
출력	1000배이상 수만배의 mA이다	500 μ A미만의 미세전류
통증치료	치료시에만 통증감소 감지	치료후에도 잔유효과 지속됨
ATP 생성	ATP의 감소및 조직손상	500 μ A미만에서 500% 증가효과
암환자의 통증	금지	암의 통증을 포함 또는 모든통증에 적용증인가 (미국 FDA)

A. 기존방법

1. TENS 통전방식
2. 두개의 스틱도자로 이어지는 방식 **주류이다**
치료시간이 길고 (20~40분) 비 효과적

B. 신 개발 (K-Point)

1. 치료시간 : 10분 전후로 치료시간이 짧다.
2. 즉석 효과가 빠르고 드라마틱 하다.

• 조직세포의 유전자 의학 발전으로 미세전류치료는

1. 통증치료 뿐만 아니라
2. 유전자 변이에 의한 질병을

또한 역분화 유도 효과로 증명된 (2004년) 줄기세포등의 성공으로 연구와 전망은 무궁무진 하다고 지적해 드립니다.

연구윤리

IBR

/ 노효련



포스터

session

고유성 신경근 촉진법의 방산기법으로 반대측 아래팔 뒤침근에 미치는 영향

강승국 · 이수경^{1*} · 옥명수 · 이승민 · 안수홍 · 양주희 · 조현대²

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Comparison of Muscle Activity in the Contralateral Forearm Supination from PNF Arm Pattern

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<Abstract>

Purpose: This study compared and analyzed the effect of the proprioceptive neuromuscular facilitation (PNF) arm flexion pattern on the contralateral forearm supination muscles when the patterns were applied to the same subject.

Methods: In the study, 5 healthy men and women who understood the PNF patterns were selected as participants. The participants completed the PNF arm flexion-abduction-external rotation pattern in the supine position. While the patients completed each pattern, the contralateral forearm supination muscle activity was measured to examine the irradiation effect. The PNF arm flexion pattern was used after three repeated measurements, using maximum resistance by trained therapist.

Results: When the arm flexion-abduction-external rotation pattern was completed, the contralateral muscle activity in the Biceps femoris muscle, Supinator muscle, Pronator teres muscle, Pronator quadratus muscle. Especially Biceps femoris muscle(1.78→3.99), Supinator muscle(1.96→3.79) was increased high. Biceps femoris muscle, Supinator muscle was activity in forearm supination. In conclusion PNF arm pattern during activity in contralateral forearm supination.

Conclusion: The PNF arm flexion pattern showed greater muscle activity on the contralateral forearm supination muscle. Thus, the PNF arm flexion pattern in more effective in the activation forearm movement.

Key Words: Proprioceptive neuromuscular facilitation (PNF), Forearm supination, Muscle Activity, Irradiation

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교각 운동시 엉덩관절의 벌림 저항강도가 만성 허리 통증 환자의 허리 주변 근 활성도에 미치는 영향

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Effects of the abduction resistance strength of the hip joint on muscle activity during bridge exercise in patients with chronic back pain

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<Abstract>

Purpose: The aim of this study was to investigate the effects of different levels of abduction resistance strength of the hip joint on the activity of muscles around the lower back during bridge exercise in female patients with chronic back pain.

Methods: The subjects were 20 female patients with low back pain. After applying the abdominal drawing-in maneuver, subjects were given different levels of resistance strength (20mmHg, 40mmHg, 60mmHg) for hip abduction and bridge exercise was performed in the order of randomly selected levels of resistance strength. Electromyography (EMG) signals were measured using EMG measurement equipment (TeleMyo DTS). EMG signals were normalized to %MVIC, and one-way repeated-measures ANOVA was used to examine differences in the mean values of muscle activity and muscle activity ratios. The statistical significance level was set at $p < 0.05$.

Results: The muscle activity of the gluteus maximus and gluteus medius was significantly increased as resistance strength increased. The muscle activity of the biceps femoris decreased as resistance strength increased, but a significant decrease was observed only in the comparison of the measured values at the resistance strength of 20mmHg and 40mmHg. The erector spinae did not show any significant changes in muscle activity according to the levels of resistance strength. The comparison of muscle activity ratios between the resistance strength levels of 60mmHg and 20mmHg and between 40mmHg and 20mmHg showed that the gluteus medius/erector spinae and gluteus maximus/erector spinae muscle activity ratios were significantly increased as resistance strength increased.

Conclusion: Study findings suggest that application of resistance exercises for hip abduction during bridge exercise can be helpful for improving the muscle weakness of the gluteus maximus and gluteus medius caused by chronic back pain.

Key Words: Bridge Exercise, Hip Abduction, Low Back Pain, Electromyography (EMG), Resistance Strength

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간헐적 대 지속적 정적 신장이 뒤넙다리근 근긴장도와 관절가동범위에 미치는 즉각적인 효과

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Immediate Effect of Intermittent Versus Continuous Hamstring Static Stretching on Muscle Tone and Range of Motion

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<Abstract>

Purpose: The purpose of this study was to determine which stretching exercise had the most positive effect on hamstring flexibility under the same conditions and the same exercise time and whether there was a difference between continuous stretching and intermittent stretching.

Methods: This study included 30 healthy university students from Daegu University. Before the start of this study, all subjects understood the content of this study and signed an informed consent form. Students were asked to sit on a mat and do hamstring stretching exercise to measure the ROM and muscle tone with pre and post-tests. The participants conducted hamstring stretching exercises with a sit-and-reach box at three different rest time periods(0s, 10s and 20s), after which they underwent PKE tests in which measure the ROM of knee joint was measured with goniometer and the muscle tone were evaluated using a MyotonPro.

Results: The results of this study revealed significant differences in muscle tone, stiffness and ROM between pre-test and post-test in each groups($p<.05$). Although post hoc tests indicated there were no significant differences in muscle tone and ROM between continuous stretching group and the intermittent stretching group ($p>.05$), the change rate of ROM showed that intermittent stretching group developed more effective maintenance of hamstring flexibility.

Conclusion: There were no significant differences in muscle tone of hamstring and ROM of knee joint according hamstring stretching exercises with three different rest time periods: however, the change rate of ROM showed intermittent stretching more effectively maintained hamstring flexibility.

Key Words: Static stretching, Muscle tone, Range of motion

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인지과제를 적용한 이중과제 훈련이 경증치매노인의 인지기능 및 베타 아밀로이드 수치에 미치는 영향

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Effects of Dual-Task Training with Cognitive Tasks on the Cognitive Function and β -amyloid levels in Elderly with Mild Dementia

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<Abstract>

Purpose: The purpose of this study was to examine effects on the cognitive functions and β -amyloid levels of the dual-task training with cognitive tasks in elderly with dementia.

Methods: The subjects were 37 elderly inpatients diagnosed with mild dementia at S Hospital located in Gyeongsangbuk-do, South Korea. The patients were randomly divided into a dual-task training group (experimental group I; n=13), a single-task training group (experimental group II; n=12), and an aerobic exercise group (control group; n=12). These groups performed their respective exercises for a 30-minute session occurring three times a week over an eight-week period. The Korean version Mini-Mental State Examination (MMSE-K) and the Global Deterioration Scale (GDS) were used to measure the subjects' cognitive function. To assess the subjects' dementia related factors, their β -amyloid levels were measured through blood analysis.

Results: The results of the experiment were as follows: Experimental group I showed statistically significant differences between the subjects' MMSE-K scores and their β -amyloid levels before and after the intervention ($p < .05$), whereas they exhibited no statistically significant differences in their GDS scores.

Conclusion: The present study's overall results indicate that dual-task training with cognitive tasks is effective in improving cognitive functions and β -amyloid levels in elderly with mild dementia. In other words, regular dual-task training is considered effective in improving cognitive function and dementia-related factors, in elderly with mild dementia, and thus this may be suggested as an effective exercise method for the treatment and early prevention of dementia.

Key Words: Dual-Task Training Mild dementia, Alzheimer, β -amyloid

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가상현실 훈련이 만성 뇌졸중 환자의 기능에 미치는 영향: 체계적 고찰 및 메타분석

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The Effects of Virtual Reality Training on Function in Chronic Stroke Patients : A Systematic Review and Meta-Analysis

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<Abstract>

Purpose: The aim of this study was to perform a meta-analysis to examine whether virtual reality (VR) training is effective for lower limb function as well as upper limb and overall function in chronic stroke patients.

Methods: Three databases, OVID, PubMed, and EMBASE, were used to collect articles. The search terms used were “Cerebrovascular accident (CVA),” “Stroke”, and “Virtual reality”. Consequently, twenty-one studies were selected in the second screening of meta-analyses. The PEDro scale was used to assess the quality of the selected studies.

Results: The total effect size for VR rehabilitation programs was 0.440. The effect size for upper limb function was 0.431, for lower limb function it was 0.424, and for overall function it was 0.545. The effects of VR programs on specific outcomes were most effective for improving muscle tension, followed by muscle strength, activities of daily living (ADL), joint range of motion, gait, balance, and kinematics.

Conclusion: The VR training was effective in improving the function in chronic stroke patients, corresponding to a moderate effect size. Moreover, VR training showed a similar effect for improving lower limb function as it did for upper limb function.

Key Words: Virtual reality, Stroke, Function, Systematic review, Meta analysis

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다양한 운동방법이 중간볼기근에 미치는 영향

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Effects of Various Exercise Methods on Gluteus Medius Muscle

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<Abstract>

Purpose: This study is aimed at examining the effects of closed kinetic chain (CKC) and open kinetic chain (OKC) exercises through a diverse range of exercise methods on the level of activities of the gluteus medius muscle..

Methods: This study was conducted on 5 adult females who disclosed their voluntary intention to participate in the research study as the subjects with the order of the exercise methods for each posture decided through a randomized controlled trial. The level of activity of the gluteus medius muscle was measured by using the surface electromyogram Noraxon telemyo 2400 system (TM DTS, Noraxon, Scottsdale, Arizona, USA). A total of 6 types of exercises comprised of 3 CKC exercises and 3 OKC exercises were performed. Each exercise was executed for the standing posture, lateral reclined posture, and dynamic posture (splits) with use of a reformer device. In order to measure the same force for each exercise, pressure in the range of 10~80mmHg was maintained through biofeedback. OKC exercise was executed after having spread the legs by an angle of 30° with the use of elastic band, and CKC exercise was also executed after having spread the legs by an angle of 30°. Exercise for each posture was executed 3 times over a period of 5 seconds and the average value of the outcomes was used as data for analysis.

Results: As the results of this study, the levels of activities of gluteus medius muscle were 34.69 and 59.36 for OKC and CKC, respectively, in the dynamic reformer posture, while they were 19.84 and 29.04 for OKC and CKC, respectively, in the standing posture, and 16.15 and 21.56 for OKC and CKC, respectively, in the lateral reclined posture.

Conclusion: As the results of this preliminary thesis, it is anticipated that the dynamic CKC exercise using a reformer device would be most efficient in fortifying the gluteus medius muscle. However, it is difficult to generalize the outcome due to the small number of subjects. As such, it is necessary to conduct additional research to further verify the effects of this study by increasing the number of subjects in the future.

Key Words: CKC (closed kinetic chain), OKC (open kinetic chain), Biofeedback Unit, Reformer

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복부 드로잉-인 기법이 평지 보행 시 몸통과 다리의 근 활성도에 미치는 효과

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Effects of Abdominal Drawing-in Maneuver on Muscle Activity of Trunk of Trunk and Legs during Flat Walking

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<Abstract>

Purpose: The purpose of this study is to investigate the difference in muscle activity of trunk and legs during flat walking with or without abdominal drawing-in maneuver.

Methods: This study was conducted with 15 healthy males and 8 females who were attending D University in Busan. This experiment was conducted after 15 minutes of abdominal drawing-in training using a pressure biofeedback unit before the experiment, and the difference in muscle activity of trunk and legs during flat walking with or without abdominal drawing-in technique was investigated. Surface electromyography was used, and the electrode attachment site was 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). Statistics were used for spss version 18.0 (IBM) and analyzed using a paired t-test.

Results: The results of this study showed that rectus abdominis muscle, external abdominal oblique muscle, transverse abdominis muscle, vastus medialis muscle were significantly increased and maintained more than walking without maintaining abdominal drawing-in maneuver ($p < 0.05$), and erector spinae muscle was significantly decreased and maintained more than walking without maintaining abdominal drawing-in maneuver ($p < 0.05$).

Conclusion: Maintaining abdominal drawing-in maneuver during flat walking is more effective during walking training.

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

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복부 드로잉-인 기법 유무에 따른 PNF 다리 굽힘 패턴이 동측 몸통과 다리의 근 활성도에 미치는 효과

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Effect of PNF Leg Flexion Pattern on Muscle Activity of Ipsilateral Trunk and Leg with and Without Abdominal Drawing-in Maneuver

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<Abstract>

Purpose: The aim of this study was to the effect of abdominal drawing-in maneuver on the muscle activity of the ipsilateral trunk and leg during proprioceptive neuromuscular facilitation (PNF) leg flexion, adduction, and external rotation with knee flexion (D1) patterns.

Methods: The subjects of this study were 5 healthy men and women (4 males and 1 females), and they were performed by a physical therapist who correctly understood the PNF leg patterns (D1) and applied it in clinical practice. Subjects were trained and practiced for 20 minutes prior to measurement to ensure that the PNF bridge pattern (D1) was correctly performed. and The abdominal drawing-in maneuver was also experimented after sufficient learning for 15 minutes through biofeedback Unit. In this study, we measured the muscle activity of the trunk and leg when the PNF leg pattern (D1) was performed by the physical therapist with or without abdominal drawing-in maneuver. Muscle activity was measured on the right transverse abdominis muscle (TRA), external abdominal oblique muscle (EO), internal abdominal oblique muscle (IO), erector spinae muscle (ES), vastus medialis oblique muscle (VMO), vastus lateralis oblique muscle (VLO), tibialis anterior muscle (TA) and compared using the mean value after a total of three repeated measurements.

Results: Muscle activity changes before and after the abdominal drawing-in technique in the PNF leg pattern were compared with TRA (10.21 → 25.2), EO (6.14 → 20.13), IO (8.97 → 28.73), ES (5.60 → 7.13), and VMO (10.42 → 11.57), VLO (6.95 → 7.77), TA (56.83 → 73.9), maintaining abdominal drawing-in maneuver increased muscle activity of the trunk and legs.

Conclusion: The preliminary results suggest that maintaining abdominal drawing-in technique during PNF leg pattern (D1) training will increase the torso and leg muscle activity, resulting in more effective training. However, because this study is a preliminary experiment, the number of subjects is small. Further research is needed to increase the number of study subjects in the future.

Key Words: PNF(proprioceptive neuromuscular facilitation), Abdominal Drawing-in Maneuver, Biofeedback Unit, Muscle Activity

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시각 차단 유무에 따른 PNF 다리 굽힘 패턴이 몸통 및 다리의 근활성도에 미치는 영향

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The Effects of PNF Leg Flexion Patterns on Muscle Activity of Trunk and Leg with and without visual

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<Abstract>

Purpose: The purpose of this study attempts to find out how the pattern of proprioceptive neuromuscular facilitation (PNF) leg flexion, adduction, and external rotation with knee flexion (D1) patterns with and without visual affects the muscular activity of the trunk and legs.

Methods: The subjects of this study were 5 adults (4 males and 1 female). The training was conducted for 20 minutes on the PNF leg patterns (D1) for all subjects. The three positions were performed using supine position and wedge to block visual position, and wedge to allow the target to see patterns position. Electromyography (EMG, TM DTS, Noraxon, USA) was used to measure the difference in muscle activity between the legs and trunk, attached to external abdominal oblique muscle, internal abdominal oblique muscle, transverse abdominis muscle, vastus medialis muscle and vastus lateralis muscle, tibialis anterior muscle. The PNF leg patterns (D1) was used after three repeated measurements, using maximum resistance by trained therapist.

Results: In the supine posture, external abdominal oblique muscle 7.57, internal abdominal oblique muscle 9.99, transverse abdominis muscle 10.51, vastus medialis muscle 10.53 and vastus lateralis muscle 6.62, tibialis anterior muscle 66.82. After using the wedge, the visually blocked posture was external abdominal oblique muscle 11.21, internal abdominal oblique muscle 14.01, transverse abdominis muscle 13.36, vastus medialis muscle 11.36 and vastus lateralis muscle 8.64, tibialis anterior muscle 71.91. Visual feedback posture after using wedge showed abdominal oblique muscle 14.31, internal abdominal oblique muscle 16.68, transverse abdominis muscle 17.06, vastus medialis muscle 13.64 and vastus lateralis muscle 9.84, tibialis anterior muscle 72.40. In the posture with visual feedback and the PNF leg patterns (D1), muscle activity was the highest.

Conclusion: This preliminary experimental results suggest that visual feedback posture using wedge will increase muscle activity of trunk and leg muscles when training the PNF leg patterns (D1).

Key Words: PNF(proprioceptive neuromuscular facilitation), Visual feedback, Muscle activity, Wedge

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전방 머리 자세에서 복부 드로잉 운동과 턱 당기기 자세에서 복부 드로잉 운동 시 배가로근 근 두께의 차이

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Differences in Transvers abdominis muscle thickness during Chin-in Posture and Forward head posture in Abdominal Drawing-in Maneuver

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<Abstract>

Purpose: This study investigates differences in transvers abdominis muscle thickness during chin-in posture and forward head posture in abdominal drawing-in maneuver.

Methods: Five people were selected for the experiment and the purpose of the study was fully explained to the subjects, and the agreement was received and conducted. All of the subjects were trained in the forward head posture and chin-in posture, and the Abdominal Drawing-in Maneuver were taught. The subjects were trained abdominal drawing-in maneuver for 15 minutes using a pressure biofeedback unit. and The muscle activity thickness of the transvers abdominis muscle during forward head posture and chin-in posture observed with the abdominal drawing-in maneuver using ultrasonic waves.

Results: When observing the muscle thickness of the transvers abdominis muscle using ultrasonic waves without intervention in a comfortable position, it was found to be 0.43 cm. When observing the muscle thickness of the transvers abdominis muscle in the forward head posture, the results of 0.41cm were confirmed and 0.46cm was confirmed during abdominal drawing-in maneuver with the forward head posture. and When measuring the muscle thickness of the transvers abdominis muscle in the chin-in posture, 0.43cm was identified and 0.66cm was observed when abdominal drawing-in maneuver was performed in the chin-in posture.

Conclusion: According to this study, the muscle thickness of the gut muscles was thicker when the abdominal drawing-in maneuver was performed in the chin-in posture than when the abdominal drawing-in maneuver was in the Forward head posture. However, since this study has fewer subjects and applies to the general public, further research is needed.

Key Words: Abdominal Drawing-in Maneuver, Chin-in, Forward head, Transvers abdominis

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키네시오라지 테이프를 이용한 발란스 테이핑이 발목 근피로 후 최대회전력에 미치는 즉각적인 효과

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Immediate Effect of Balance Taping Using a Kinesiology Tape on Peak Torque after Ankle Muscle Fatigue

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<Abstract>

Purpose: This study aims to investigate the immediate effects of balance taping using a Kinesiology tape on peak torque of the ankle after inducing ankle muscle fatigue.

Methods: Six healthy adult men were randomized to the balance taping group and fatigue recovery group. After inducing muscle fatigue on the ankle using isokinetic equipment, the participants performed balance taping or ankle fatigue recovery exercise and underwent the isokinetic test again. Data were analyzed with the SPSS18.0 for windows software, and patients' sex, age, and body weight were analyzed with descriptive statistics. Change of peak torque were analyzed with the Wilcoxon sign ranks test, and significance level (α) was set at .05.

Results: The balance taping group showed statistically significant changes in dorsiflexion peak torque from 19.55 ± 2.08 to 25.88 ± 2.50 and plantarflexion peak torque from 51.31 ± 7.97 to 66.55 ± 11.05 ($p < .05$). The muscle fatigue recovery exercise group also showed statistically significant changes in dorsiflexion peak torque from 20.83 ± 1.69 to 26.58 ± 2.46 and plantarflexion peak torque from 50.10 ± 6.24 to 59.25 ± 6.90 ($p < .05$). There were no significant differences between the two groups after their respective interventions ($p > .05$).

Conclusion: Balance taping on fatigued ankle would help recover from ankle muscle fatigue, as would fatigue recovery exercise. Further studies are needed to examine the effects of balance taping in improving ankle muscle fatigue.

Key Words: Balance Taping, Biodex, Muscle fatigue

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유산소 운동의 강도가 알츠하이머 환자의 신경영양성인자 발현에 미치는 영향

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The Effects of Intensity of Aerobic Exercise on Neurotrophic Factors in Alzheimer's Rats.

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<Abstract>

Purpose : This study applied a treadmill training as a method of aerobic exercise to rats in order to analyze effects of varied exercise intensities on neurotrophic factors including.

Methods : The Alzheimer's induced rats were randomly divided into a control group(CG, n=8), a group of low-intensity exercise(Group I, n=8), a group of mid-intensity exercise(Group II, n=8), and a group of high-intensity exercise(Group III, n=8). The group I, II, and III underwent the treadmill exercise for 20 minutes, five times week, for four weeks. We used for SPSS 22.0 for windows.

Results : The results of this study were as follows : When neurotrophic factors were measured, showed significant differences in Group I, Group II, and Group III when compared to that of the control group, but without significant differences based on exercise intensity. BDNF showed significant differences in Group I, Group II, and Group III when compared to that of the control group, and the expression ratio was markedly higher in Group III than in Group I and II.

Conclusion : According the results of this study, aerobic exercise can improve expression of neurotrophic factors in Alzheimer's induced rats. In addition, high-intensity aerobic exercise, in particular, can induce more effects on changes in neurotrophic factors. The results of this study can be provided as useful basic data in developing treatments for Alzheimer's disease patients.

Key Words: Alzheimer, Intensity of Aerobic Exercise, Neurotrophic Factors

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필라테스 호흡 유무에 따른 리포머를 이용한 풋 워크 운동이 균형능력에 미치는 영향

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Effects of Footwork Exercise using Reformer on Balance Ability with and Without Pilates Breathing

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<Abstract>

Purpose: This study aims to find the effect of pilates breathing on the enhancement of balancing ability during footwork exercise using a reformer.

Methods: This study was conducted in 10 adult women divided into two groups (Pilates breathing group and control group). The purpose of this study was to investigate the effects of reformer footwork exercise between two groups and reformer footwork exercise within the groups on the static balance. In the footwork exercise, the feet were maintained in parallel, and a total of 4 sets of 10 times of two foot on board and 2 sets of 10 times of one foot on board were done on the left and right. The exercise proceeded for a total of 30 minutes, and a 30 minutes rest after exercise was done in order to prevent muscle fatigue. Static balance measurement was done using Zebris (FDM Multifunction Force Measuring Plate, Germany), and a total of 3 times of standing with eyes open, standing with eyes closed, and standing on a right foot are repeatedly measured and the median is used.

Results: As a result of this study, when standing with eyes open before/after reformer footwork exercise, migration area (mm²) in the pilates breathing group decreased from 107.80 → 66.60, and that in the control group decreased by 6.00 from 89.40 → 83.40. When standing with eyes closed, the migration area (mm²) decreased by 69.80 from 602.80 → 533.00, and that in the control group decreased by 20.40 from 525.80 → 505.40. When standing on the right foot, the migration area (mm²) decreased by 145.80 from 505.40 → 359.60 and that in the control group decreased by 142.40 from 523.80 → 381.40.

Conclusion: Results of this preliminary study suggest that maintaining pilates breathing and performing reformer footwork will be more effective in improving balance. However, the small number of subjects makes it difficult to generalize.

Key Words: Pilates breathing, Balance, Reformer, Footwork exercise

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다양한 자세에서 턱당기기 기법이 목과 어깨의 근활성도에 미치는 영향

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Effect of Chin-in Maneuver on Neck and Shoulder Muscle Activity in Various Postures

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<Abstract>

Purpose: This study investigates the effects in the muscle activities of the neck and shoulder depending on chin-in maneuver in various postures.

Methods: In this study, five healthy adults in their 20s were tested with no musculoskeletal neurological disorders, symptoms and functional limitations (4 males and 1 female). After sufficient training on the chin-in maneuver before the experiment, the chin-in maneuver was carried out in the supine position, sitting position and standing position according to the experimenter's instructions. Muscle activity was measured in a random order, 3 times per position for 5 seconds, and a 30 second rest period between exercises.

Results: In the supine position, muscle activity was Sternocleidomastoid 4.86, Scalene 7.97, Upper trapezius 2.93, Levator scapula 3.37, and in sitting position, Sternocleidomastoid 5.28, Scalene 8.77, Upper trapezius 4.66, Levator scapula 4.99 and in standing position, Sternocleidomastoid 8.75, Scalene 14.89, Upper trapezius 5.71, Levator scapula 6.15. All muscle activity was the lowest in the supine position.

Conclusion: In the supine position, the surface muscles of the neck and shoulder were the lowest in the posture and the highest in the standing position. Therefore, it is most efficient to use the supine position rather than the standing position when performing the chin-in maneuver.

Key Words: Chin-in maneuver, various postures, Muscle Activity

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발란스 테이핑이 비특이성 요통에 미치는 즉각적인 효과: 사례 연구

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The Immediate Effect of Balance Taping on Nonspecific Low Back Pain: A Case Study

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<Abstract>

Purpose: The purpose of this study was to evaluate the immediate effects of balance taping using kinesiology tape on patients with trunk flexion pain and limited range of motion (ROM).

Methods: Balance taping was applied to nonspecific low back pain patients with trunk flexion pain and limited ROM of trunk flexion.

Results: After balance taping to the right abdominal and the left Quadratus lumborum muscles, low back pain decreased from VAS 5 to 0 and trunk flexion increased from 60° to 85° degrees.

Conclusion: Balance taping may help reduce pain and increase trunk ROM for nonspecific low back pain. Further research on the effects of balance taping on nonspecific low back pain should be conducted.

Key Words: Nonspecific Low back pain, Balance Taping, Kinesiology tape

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수술 자국에 Cross Taping이 정적균형에 미치는 즉각적인 효과: 사례 연구

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The Immediate Effect of Cross Taping on the Surgical Scars: A Case Study

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<Abstract>

Purpose: The purpose of this study was to investigate the immediate effect of cross taping on static balance in the surgical scars of the knee.

Methods: The static balance was measured by using BioResque before and after applying cross taping to the surgical scars in patients who had surgical scars due to patellar fracture.

Results: After cross taping on the surgical scars of the knee, the surface area ellipse was decreased from 504mm² to 455mm² and the length was decreased from 103.6cm to 82.0cm, respectively.

Conclusion: Cross taping on the surgical scars of the knee immediately increased static balance. In the future, further studies to investigate the effect of the static balance of cross taping on surgical scars should be carried out.

Key Words: Static balance, Cross Taping, Surgical scars

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기능적 전기작용이 경직성뇌성마비아동의 발성능력에 미치는 영향

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Effects of Functional Electrical Stimulation on the Speech Ability of Spastic Cerebral Palsy

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<Abstract>

Purpose: The purpose of this study is to find out about the change in phonation time of functional electrical stimulation in children with Spastic cerebral palsy.

Methods: After measuring the maximum phonation time(MPT) of 10 cerebral palsy before experimenting, attach the surface electrode of the functional electronic stimulation system(Physio 8, U.K.) directly to the bottom of the rib and to the rectus abdominis, and the 300 μ s circulation of the electric pulse, cycle was 50%, frequency 45Hz, stimulation strength 35-90mA/5cm², initially increased from low intensity, 30minutes duration 3 time per week for 8weeks and again measured the MPT. we used for SPSS 12.0 for windows.

Results: The change in MPT of the exercise group was 8.03 \pm 1.89sec before application, 10.09 \pm 2.13sec for application, 11.31 \pm 2.00sec for application, 13.61 \pm 1.93sec for 6 weeks, 15.55 \pm 2.45sec for 8 weeks, 14.33 \pm 2.38sec for 2 weeks after application, The functional electrical stimulation group was 8.25 \pm .62sec before application, 9.42 \pm 1.80sec for two weeks, 10.27 \pm 2.01sec for four weeks, 11.90 \pm 1.94sec for six weeks, 13.04 \pm 1.68sec for eight weeks, 12.77 \pm 1.69sec for two weeks after application, The control group were 8.81 \pm 2.03sec before application, 8.98 \pm 2.08sec for 2 weeks, 8.90 \pm 2.21sec for 4 weeks, 8.99 \pm 2.18 sec for 6 weeks, 8.95 \pm 2.21sec for 8 weeks, 9.06 \pm 2.11 weeks after application.

Conclusion: The change in the phonation time of functional electrical stimulation to the rectus abdominis of Spastic cerebral palsy increased significantly.

Key Words: Spastic Cerebral Palsy, Functional Electrical Stimulation, Phonation

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Effects of Sympathetic Conversation on Electroencephalogram, Stress, Anxiety-Depression, and Muscle Tone in Chronic Stroke Patients

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<Abstract>

Purpose: This study was conducted to identify the effects of sympathetic conversation on stress, anxiety and depression, and muscle tone in chronic stroke patients.

Methods: Patients were randomly assigned to either an experimental group (EG, n=7) or control group (CG, n=7).

Both groups participated in a pretest before intervention. Subjects were asked to undergo: 1) electroencephalogram, 2) Stress Response Inventory, 3) Hospital Anxiety and Depression Scale, 4) muscle tone and stiffness testing. After the pretest, EG received sympathetic conversation and CG received a simple explanation about stroke recovery and rehabilitation. Following the intervention, both groups were immediately administered a post test.

Results: In EG, the electroencephalogram relative alpha power was significantly increased ($p<.05$), while the electroencephalogram relative gamma power was significantly decreased ($p<.05$). The Stress Response Inventory and Hospital Anxiety and Depression Scale scores decreased significantly in both groups ($p<.05$). In addition, muscle tone and stiffness decreased significantly in the EG ($p<.05$).

Conclusion: The results of the present study indicate that sympathetic conversation had a positive effect on stress, anxiety and depression, and muscle tone in patients with chronic stroke. Therefore, sympathetic conversation could be used to improve not only psychological problems in chronic stroke patients including stress and anxiety, but also physical conditions including muscle tone.

Key Words: Conversation, Electroencephalogram, Sympathetic, Stroke

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골반벨트를 적용한 체간 안정화 운동이 뇌졸중 환자의 자세조절과 균형에 미치는 영향

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The Effect of Trunk Stability Exercise using Pelvic Belt on Posture Control and Balance in Stroke Patients

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<Abstract>

Purpose: To investigate whether wearing a pelvic belt during a trunk stability exercise program positively affects balance in stroke patients.

Methods: Twenty-four hemiplegic stroke patients were randomly allocated either to the experimental group (EG) or control group (CG). All participants performed 60 min of comprehensive rehabilitation treatment followed by an additional 30 min of trunk stability exercise five times per week for 6 weeks. Participants in the EG wore a pelvic belt whereas participants in the CG did not, while completing the trunk stability exercises.

Results: We observed significant improvements in balance after training in both groups ($p < 0.05$). The EG group showed significantly greater magnitude of improvements in balance than did the CG group (Postural Assessment Scale for Stroke, 8.8 vs. 4.9 points, $d = 1.5$; Berg Balance Scale, 6.3 vs. 2.8 points, $d = 1.8$; Timed Up and Go Test, -2.8 vs. -1.1 s, $d = -1.2$; center of pressure (COP) path length with eyes open, -2.09 vs. -1.13 cm, $d = -1.1$; COP path length with eyes closed, -2.31 vs. -0.86 cm, $d = -1.2$; COP path velocity with eyes open, -0.25 vs. -0.12 cm/s, $d = -2.6$; COP path velocity with eyes closed, -0.24 vs. -0.14 cm/s, $d = -1.0$).

Conclusion: Wearing a pelvic belt while completing a trunk stability exercise program appeared to be a more effective approach for improving balance in patients following a stroke.

Key Words: Pelvic Belt, Trunk Stability Exercise, Postural Control, Balance, Stroke

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경직형 뇌성마비 아동의 전신진동자극 훈련 효과

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Effect of Whole Body Vibration Training for Children with Spastic Cerebral Palsy

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<Abstract>

Purpose : The purpose of this study is to investigate the effect of whole-body vibration(WBV) stimulation training, on the lower extremity muscle thickness and function of the children

Methods : Twenty cerebral palsy children (aged 5 to 10) were recruited in two hospitals of Seoul. Inclusion criteria was those who were able to stand independently of the child, had Gross Motor Function Classification System Level I-II, had sufficient communication skills to understand the verbal instructions required by the examiner. Control group were received conventional treatment, consisting of 30 minutes per a day in 5 times a week for 10 weeks. WBV group program were consisted 30 minutes WBV training a day in 3times a week and 30 minutes conventional treatment per a day in 2 times a week for 10 weeks. WBV training were included five sessions (①12-16 Hz, ②16-20 Hz, ③ 20-24Hz, ④16-20Hz, ⑤12Hz, by Galileo® Med S, Germany). The thickness of muscles was evaluated by a skillful physician and GMFM was evaluated by a expert physical therapist. Data were statistically analyzed using SPSS Statics (IBM, Korea) for window version 25.0. The general characteristics of the subjects were calculated by using descriptive statistics. The Man Whitney u-test was performed to analyze the differences between the two groups.

Results : There was a statistically significant difference in the GMFM (D) and GMFM (E) ($p<.05$). In muscle thickness, there was no significant increase in the gastrocnemius (GCM) muscle in the experimental group compared to the control group ($p>.05$), but there was a significant increase in the tibialis anterior (TA) muscle ($p<.05$).

Conclusion : We confirmed the possibility that WBV stimulation training for children with spastic cerebral palsy could be used in place of resistance exercise, which is commonly used to improve muscle strength of lower extremity.

Key Words : Whole body vibration stimulation training, Cerebral pasly, Muscle thickness, GMFM



일반
session

중증 뇌졸중 환자의 보행과 균형 능력 향상을 위한 수중보행훈련과 지상보행훈련 비교: 무작위 대조군 예비연구

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Comparison of Underwater Gait Training and Overground Gait Training for Improving the Walking and Balancing Ability of Patients with Severe Hemiplegic Stroke: A Randomized Controlled Pilot Trial

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<Abstract>

Purpose: The purpose of this study was to compare the effects of underwater walking training and ground walking training on the balance ability and gait improvement of severe stroke patients.

Methods: A total of 21 patients with severe hemiplegic stroke were randomly assigned to the experimental and control groups. After comprehensive rehabilitation conducted 5 times a week, the experimental and control groups underwent underwater and overground walking training, respectively, for 30 minutes three times a week for 12 weeks. Balancing ability and gait parameters were measured before and after the 12-week training.

Results: A statistically significant increase in the post-intervention Postural Assessment Scale for Stroke score, compared to the pre-intervention score was noted in the control group (32.0 points vs 23.0 points). Both groups showed a statistically significant decrease in the center of pressure (COP) path length and velocity after the intervention compared to the values before the intervention. The step length difference increased after the intervention compared to that before the intervention (+3.13 cm), whereas that of the control group decreased (-3.00 cm). The step length difference changes after training between the two groups showed a significant difference ($p < .05$).

Conclusion: In severe stroke patients, underwater walking training can be effective for improving balancing ability, but it may have a negative effect on the improvement of gait function.

Key Words: Stroke, Walking, Balance, Gait

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하지혈류제한을 적용한 저강도 트레드밀 운동이 무릎 뼈관절염을 가진 흰쥐의 보행과 통증에 미치는 영향

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Effect of Low Intensity Treadmill Exercise with Blood Flow Restriction on the Gait, Pain in Knee Osteoarthritis Rats

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<Abstract>

Purpose: This study was to investigate effect of low intensity treadmill exercise with blood flow restriction on the gait, Pain in knee osteoarthritis rats.

Methods: The subjects of this study were 30 SD rats, with knee osteoarthritis, who were randomly divided into the low intensity treadmill exercise with blood flow restriction group(Eg I ; n=10), low intensity treadmill exercise group(Eg II ; n=10), no exercise group(Cg; n=10) were recruited. Each group(Eg I , Eg II) carried out for 30 minutes exercise five times a week for 3 weeks with low intensity(8m/min). All subjects were measured to see their gait with a Dartfish program and pain(c-fos) with a western blot analysis. In order to assure the statistical significance of the results, we used for SPSS 22.0 for windows.

Results: In Experimental I group, there were significant improved in ankle angle, knee angle initial contact time, c-fos expression($p<.01$). In Experimental II group, there were no significant improved in ankle angle, knee angle initial contact time, c-fos expression($p>.05$).

Conclusion: Present study have shown that low intensity treadmill exercise with blood flow restriction has significant effects on gait ability, pain of knee osteoarthritis subjects.

Key Words: Knee osteoarthritis, Blood flow restriction, Treadmill exercise, Gait, pain

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보행 시 구두 형태가 다리근육의 근 활성화도와 에너지 소비량에 미치는 영향

김아름 · 박수빈 · 신동우 · 정지혜 · 김장곤*

UI대학교 물리치료학과

The shape of the shoes during walking is the muscle activity
of the lower extremity muscles, impact on energy consumption

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<Abstract>

Purpose: Since there are many prior studies on the difference in shoe heel height, but no research is done on the difference in shoes form, this study tries to find out the effect of shoes form on muscle activity and energy consumption in walking.

Method: Three shoe-shaped straps, pumps and walker heels were set and the shoe heels were held at 9cm and walked on treadmill for 10 minutes at a speed of 3.5km/h. The heart rate was measured before and after the experiment with comfort. The MVIC value of tibialis anterior and rectus femoris was used to measure muscle activity during walking time.

Results: Muscle activity in the three shoes forms showed no significant difference, and at the heart rate, all shoes forms showed significant differences, and Walker hill showed the greatest difference.

Conclusion: No significant difference in muscle activity with shoes form was identified, and heart rate was found to be significant. Therefore, I think it affects energy consumption by shoes form. Later, more subjects and shoe sizes could be obtained to supplement the threshold, which would provide better results.

Key Words: Energy consumption, Lower muscles, Muscle activity, Shoes form, Walking

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뒤넙다리근 단축이 있는 성인에게 스트레칭 후 테이핑 부착이 유연성과 균형에 미치는 영향

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Influence of Taping on Flexibility and Balance after Stretching to Adult with Hamstring Shortening

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<Abstract>

Purpose: The purpose of this study was to examine the effects of flexibility and balance about tape attachment after stretching to the hamstring.

Method: Twenty-five college students who reduced their hamstring numbers participated in the experiment. The experimental group was taping and the control group was not taping. Stretching took place in four sets for 15 seconds, with each set resting for 30 seconds. Flexibility was used to measure the flexibility of short hamstring using a smartphone application called the Clinometer application. We used a bioodec balance system to measure balance. Immediately before stretching, immediately after stretching, and 6 minutes later, a total of 3 measurements were made. We used two-way repeated ANOVA to identify significant differences.

Result: When measured immediately before stretching, immediately after stretching, and 6 minutes, both groups showed increased flexibility and sense of balance. There was no statistically significant difference in balance sensation with taping attachment ($p>0.05$). There was a statistically significant difference in the flexibility change with taping attachment. ($p<0.05$)

Conclusion: Regardless of the taping attachment to the short hamstring, flexibility and balance were positively affected by stretching. However, statistical flexibility was improved when taping was applied after stretching.

Key Words: Balance, Flexibility, Hamstring taping, Shortened hamstring

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뇌졸중 후 편마비 환자에서 절단점과 총 점수 비교를 통한 K-MOCA와 BBS가 MBI에 미치는 영향력 비교

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Comparison of the impact of K-MOCA and BBS on MBI using cutoff scores and total scores in patients with post-stroke hemiplegia

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<Abstract>

Purpose: This study compared the impact of the level of cognitive function and balance on activities of daily living in patients with post-stroke hemiplegia based on the cutoff scores and total scores of the K-MOCA, BBS, and MBI.

Methods: The total scores and cutoff scores of the Berg balance scale (BBS), Korean-Montreal Cognitive Assessment (K-MOCA), and Modified Barthel Index (MBI) were compared among 114 patients who had been diagnosed with stroke at least six months earlier.

Results: There were differences in the total scores and cutoff scores of K-MOCA according to the affected side. Balance, level of cognitive function, and activities of daily living were found to be strongly correlated as shown by the comparison of total scores and cutoff scores.

Conclusion: When cutoff are used, disability standards can be identified for Balance, level of cognitive function, and activities of daily living.

Key Words: Berg balance scale, Korean-Montreal Cognitive Assessment, Modified Barthel Index, Correlation, Stroke

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타이치와 택견이 노인의 기능 및 보행에 미치는 영향 비교

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Comparison of Tai Chi and Taekkyon on functional and gait ability in older adults

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<Abstract>

Purpose: This study aimed to compare the effects of TC and Taekkyon exercise programs on the lower-extremity strength, balance, and gait ability of community-dwelling older women as a fall prevention method.

Methods: Community-dwelling older women were randomly allocated into the TC group (n1= 23) and the Taekkyon group (n2= 23). Both groups completed 1 h of either TC or Taekkyon exercises twice weekly for 12 consecutive weeks (24 sessions in total). We measured the Timed Up and Go test (TUG), Functional Reach test (FR), one-leg standing test (OLS), Five Times Sit-to-Stand test (5 × STS), 30 Second Sit-to-Stand test (30 s STS), and spatiotemporal gait parameters (gait velocity, step length, step width, stride time, and cadence) before and after the intervention.

Results: Both groups similarly showed statistically significant improvements in balance (TUG, FR, and OLS), lower-extremity strength (5 × STS and 30 s STS), and spatiotemporal gait parameters except for step width (P< 0.05). Moreover, the TC group showed greater improvement in the OLS test than the Taekkyon group (P< 0.05).

Conclusion: The results from this study support the efficacy of the TC and Taekkyon exercise programs at improving mobility in this population of older women. However, this study did not clarify which exercise program is more effective as general balance and mobility training program for older women.

Key Words: Aging, balance, falling, Taekkyon, Tai Chi

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택견훈련이 노인의 계단 내려가기 보행에 미치는 영향

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Effects of Taekkyon training on balance control during stair descent in community-dwelling older adults

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<Abstract>

Purpose: The purpose of this study was to examine the effects of Taekkyon training on balance control during stair descent in community-dwelling older adults.

Methods: Participants were randomly assigned to either the Taekkyon group or wellness education group. The participants in the Taekkyon group received Taekkyon training 2 times a week for 12 weeks. The participants in the wellness education group participated in a health education program 1 hour weekly for 12 weeks. Subjects stood in a predetermined position on the top of the custom-built 3-step staircase and then descended the stairs at a self-paced speed. The changes in the translation of the center of pressure before and after Taekkyon training were measured.

Results: The Taekkyon group showed a greater increase in the displacement of the center of pressure in the anteroposterior and mediolateral directions as well as the average velocity of the center of pressure in posttesting than the wellness education group. The Taekkyon group also showed a significant increase in all measures after Taekkyon training. However, little change was found in all measures in the wellness education group.

Conclusion: These findings support the use of Taekkyon training as an effective fall-preventive rehabilitation program to reduce falling in older adults.

Key Words: Aging, balance, falling, stair climbing, Taekkyon

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만성 뇌졸중 환자의 발등굽힘근 근력강화 운동에 대한 교차 훈련 효과

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Effects of cross education of ankle dorsiflexor strengthening exercise in chronic stroke patients

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<Abstract>

Purpose: This study aimed to investigate the effects of cross education-based ankle dorsiflexor exercise on the affected and unaffected side on ankle dorsiflexor activity on the affected side and balance in chronic stroke patients.

Methods: Nineteen chronic stroke patients were randomly placed in an experimental group that performed ankle dorsiflexor strengthening exercise on both sides or a control group that performed ankle dorsiflexor strengthening exercise only on the affected side. Both groups underwent 15-minute ankle dorsiflexor exercise five times a week for 6 weeks after comprehensive rehabilitation. Tibialis anterior muscle activity in the affected side, the timed up and go test (TUG), and the 10-m walking test (10MWT) were assessed before and after the intervention.

Results: Both groups showed a significant increase in tibialis anterior muscle activity after the intervention. The experimental group showed a 165.7% increase, while the control group showed a 68.6% increase. The mean TUG and 10MWT values significantly decreased after the intervention period. The experimental group showed a 22.4% and 25.4% reduction while the control group showed a 23.1% and 20.7% reduction, respectively. There were no statistically significant differences in ankle dorsiflexor activity in the affected side and changes of TUG and 10MWT between the two groups.

Conclusion: Ankle dorsiflexor strengthening exercise seems to be effective for functional improvement of stroke patients and a cross-education effect.

Key Words: Ankle dorsiflexor, Cross-education, EMG

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양측상지의 상상훈련과 신체적 활동이 경직성 뇌성마비 아동의 상지 기능에 미치는 영향

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The Effects of Mental Practice and Physical Performance of Training Bilateral Upper Extremity on Hand Function of Children With Spastic Cerebral Palsy

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<Abstract>

Purpose: This study aims investigating the effects of Mental Practice and Physical Performance of Training Bilateral Upper Extremity on hand function of children with spastic cerebral palsy.

Methods: The participants of this study are 12 children with spastic cerebral palsy aged between 10 to 14 years old. All the subjects performed a symmetrical task(lifting a box and placing it back) that involved moving both arms at the same time and an asymmetrical task(opening and closing a bottle cap) in order to perform functional tasks. Measurements used to assess hand function are Jebsen Hand Function Test, Modified Ashworth Scale and 3D Motion Analysis. After establishment of the baseline for each client by all the measurements, reevaluations were performed every 2 weeks using Jebsen Hand Function Test and the Modified Ashworth Scale. The 3D Motion Analysis was performed only before- and after the 8 weeks of Mental Practice and Physical Performance of Training Bilateral Upper Extremity.

Results: After the Mental Practice and Physical Performance of Training Bilateral Upper Extremity, there was significant decrease in completed time for the all subtasks of Jebsen Hand Function Test were ($p<.05$) and also significant decrease in spasticity score of Modified Ashworth Scale as well($p<.05$). 3D Motion Analysis showed that the hand tapping and the finger tapping has been significantly improved($p<.05$).

Conclusion: Based on the results of this study, it is evidenced that Mental Practice and Physical Performance of Training Bilateral Upper Extremity is effective treatment for hand function of children with cerebral palsy. For future research, it is recommended to examine various protocols of Mental Practice and Physical Performance of Training Bilateral Upper Extremity including impact of long-term application.

Key Words: Mental Practice and Physical Performance, Hand Function, Cerebral Palsy

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코어근육운동과 목안정화운동이 앞쪽머리자세를 가진 일반대학생의 균형과 발압력에 미치는 영향

방현수†

김천대학교 물리치료학과

The Effects of Core Muscle exercise and Neck stabilize exercise on balance and Foot Pressure at General College Students with Forward Head Posture

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<Abstract>

Purpose: The purpose of this study was to investigate the effects of Core Muscle exercise and Neck stabilize exercise on forward head posture of general college students.

Methods: 4 weeks exercise programs were applied to the group of 24 general college male and female students with forward head posture, divided into Core Muscle exercise group(8), Neck stabilize exercise group(8), Core Muscle exercise and Neck stabilize exercise into Complex group(8). And NDI, FRT, FHPL, FP before and after experiment was measured, respectively.

Results: In the results of the study, the Neck stabilize exercise group showed a significant difference in FRT, NDI and FHPL and did not show any significant difference between FP. The Core Muscle exercise group showed a significant difference in NDI, FRT and FHPL, and did not show any significant difference between FP.

Conclusion: The results of this study showed that Core Muscle exercise and Neck stabilize exercise were effective on the head posture of general college students.

Key Words: Forward Head Posture, balance, Foot pressure

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다리 길이 차이와 몸통 비대칭 척도, 폐활량, 골반 비대칭과의 상관관계 분석연구

안성민 · 김경돈 · 김민서 · 박우현 · 안진홍 · 이재서 · 김성길*

위덕대학교 물리치료학과

Analysis of Correlation of Leg Length Difference, Trunk Asymmetry Scale, Spirometry and Pelvic Asymmetry

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<Abstract>

Purpose: The purpose of this study was to analyze the correlation of the discrepancy in functional and anatomical leg length and the discrepancy in length of Acromion to ASIS, pelvic asymmetry, Adam's angle, and vital capacity ability.

Methods: The functional leg length and anatomical leg length discrepancy between left and right, shoulder asymmetry discrepancy test, Adam's forward bend test and vital capacity measurement, and pelvic asymmetry were measured. The data was analyzed with the version of SPSS 22.0 for Window and the correlation of each measured value was analyzed for the mean value.

Results: The Anatomical Leg Length Discrepancy showed positive correlation between Adams Forward Bend Test and Functional Leg Length Discrepancy, Acromion to ASIS discrepancy ($p < 0.05$) also showed a positive correlation with FEV1/FVC ($p < 0.05$) and There was a positive correlation between discrepancy in Pelvic Asymmetric Frontals ($p < 0.05$).

Conclusion: Leg Length Discrepancy means that asymmetric scales in other areas were correlated and affected the asymmetry in other areas.

Key Words: Correlation, Vital capacity, Asymmetry

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스쿼트 운동 시의 발목관절 위치에 따른 20대 성인의 하지 근위부 및 척추기립근의 즉각적인 근활성도 비교

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The Effect of The Ankle Joint Position during Squat Exercise on The Activity of Lower Limb Muscles and Erector Spinae in Normal Adults

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<Abstract>

Purpose: To examine muscle activity in the proximal muscles of the lower limbs and erector spinae in adults in their 20s during squat performed using a slant board to vary ankle positions and to identify the most effective ankle position for increasing ankle muscle activity during exercise.

Methods: Healthy adults in their 20s (37 men and 37 women) participated in this study. The subjects were instructed to perform squat exercises in three ankle positions, namely neutral, dorsiflexion, and plantar flexion, while electromyography (EMG) signals were measured on the vastus medialis oblique (VMO), vastus lateralis oblique (VLO), biceps femoris (BF), and erector spinae (ES) muscles using surface EMG. The data were analyzed with one-factor repeated-measures analysis of variance.

Result: For the VMO, the muscle activity was higher in the plantar flexion position than in the neutral position, whereas for the VLO, it was higher in the dorsiflexion position. For the BF, no statistically significant difference in muscle activity was found across the three ankle positions. For the ES, the muscle activity increased in the dorsiflexion position and decreased in the plantar flexion position, as compared with the neutral position.

Conclusion: Dorsiflexion is considered the most effective ankle position during squat for strengthening the VMO, VLO, and ES muscles.

Key Words: Squat exercise, Ankle joint position, Electromyography, Muscle strength

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푸쉬업 플러스 시 하지의 안정화 조건에 따른 견갑주위근활성도 비교

김민혜 · 조호연 · 한민혁 · 이상용⁺

UI대학교 물리치료학과

Effect of instability condition of lower extremity on muscle
activity of shoulder muscle during push-up plus exercise

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<Abstract>

Purpose : The purpose of this study is to explore the effect of push-up plus on the shoulder activity under conditions of stabilization on the lower extremity.

Method: This study conducted on 16 healthy students who to U university in Chungbuk. EMG was used to examine changes in muscle activity around the shoulder, and surface electrodes were attached to the upper trapezius, serratus anterior, pectoralis major. The subjects performed a push-up plus exercise on a stable support surface, a stable support surface of 25cm, and an unstable support surface of 25cm height using a sling.

Result: The result of the study showed significant difference during push up plus that serratus anterior muscle activity higher slings than stable support surface and height of 25cm ($p<0.05$). and no significant differences between upper trapezius and pectoralis major according to stabilization conditions ($p>0.05$).

Conclusion : In this study, it is thought serratus anterior muscle activity is most effect during push-up plus on the 25cm sling.

Key Words: Pectoralis major, Push-up plus, Serratus anterior, Sling, Upper trapezius

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한 다리 월-스쿼트 운동 시 불안정한 지지면의 강도에 따른 다리근육의 근 활성화도 비교

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The difference of muscle activity on lower extremity muscle during single leg wall-squat exercise according to levels of unstable surface

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<Abstract>

Purpose : The objective of this study is to compare the activation levels of lower extremities muscles according to difference of air pressure during single leg wall-squat exercise.

Method : The subjects of this study were 15 healthy male undergraduates at Chung-buk U1 University. The goniometer was used to measure the angle of the knee joint during exercise and an air cushion was used as the unstable surface. In order to measure the air pressure, air pressure measuring instrument was used and changes of muscle activity in lower extremity muscles were checked through electromyograph. Electrode surfaces were attached to vastus medialis, vastus lateralis, rectus femoris, medial hamstring, lateral hamstring. The subjects were placed on an air cushion at various air pressures (1.0psi, 1.4psi, 1.8psi) and measured for muscle activity by taking a single leg wall-squat posture.

Results : In the study, there were significant differences in activation level of vastus medialis, vastus lateralis and rectus femoris muscle according to decrease of air pressure ($p<0.05$). However, there were no significant differences in medial hamstring and lateral hamstring ($p>0.05$). As a result of post-hoc comparison, the activation level of 1.0psi of vastus medialis and rectus femoris have increased significantly better than 1.4psi and 1.8psi ($p<0.05$). The activation level of 1.0psi of vastus lateralis have increased significantly better than 1.8psi ($p<0.05$).

Conclusion : During single leg wall-squat exercise, muscle activities of quadriceps have increased according to decrease of air pressure.

Key Words: Muscle activity, Quadriceps, Single-leg squat, Unstable surface

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슬링에 따른 플랭크 운동이 체간 근육의 근활성도에 미치는 영향

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According to sling, the effect of muscle activity on trunk muscle during plank exercise

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<Abstract>

Purpose: Comparison of core muscle activity during plank exercise that using normal support surface, unstable support surface air cushion and sling

Method : Research targets was healthy adult males 15 peoples. an unstable support surface was used to identify air cushion, step box to match the same height, and EMG to determine muscle activity changes in the body muscles. electric surface was attached to upper rectus abdominis, lower rectus abdominis, external oblique abdominis, erector spine muscles. In order to make a difference in the support surface during the plank movement that general ground plank exercise, togu was applied upper extremities plank exercise, and also sling was applied upper extremities plank exercise. the exercise order was random.

Results : There was a significant difference in muscle activity in the plank exercise according to three supporting surface that upper rectus abdominis, lower rectus abdominis, external oblique abdominis, erector spine muscles ($p<0.05$). In the post-hoc, sling plank muscle activity in upper rectus abdominis, lower rectus abdominis, external oblique abdominis, erector spine muscles activity were significantly higher than general ground plank exercise, togu plank exercise.

Conclusion : Plank exercise using sling influenced to upper rectus abdominis, lower rectus abdominis, external oblique abdominis, erector spine muscles activity rather than normal surface plank motion and togu plank motion.

Key Words: Muscle activity, Plank, Sling, Trunk muscle

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경직성 햄스트링을 동반한 슬개대퇴통증 환자에서 정적 그리고 동적스트레칭의 효과: 단일맹검, 무작위대조시험

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The Effects of Static and Dynamic Stretching Exercises in the PatelloFemoral Pain patients with Inflexible Hamstring: A single Blinded, Randomised Controlled Trial

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<Abstract>

Purpose: To compare the hamstring flexibility, knee muscle strength, neuromuscular control, and clinical outcomes such as visual analogue pain scale (VAS), anterior knee pain scale (AKPS), after static and dynamic hamstring stretching exercises in the patellofemoral pain (PFP) patients with inflexible hamstring.

Methods: A total of 46 patients (25, static stretching exercise; 21, dynamic stretching exercise) participated. Hamstring flexibility was assessed by popliteal angle during active knee extension in supine position. Muscle strength and neuromuscular control were measured using an isokinetic device. Clinical outcomes were evaluated using VAS and AKPS.

Results: There was no difference in the hamstring flexibility and knee muscle strength of the involved knees between the groups ($p > 0.05$). Neuromuscular control and clinical outcomes were significantly improved on the involved knees of the dynamic stretching groups compared with that of the static stretching groups. On the static stretching groups, there was significantly improved for the hamstring flexibility, knee muscle strength, and clinical outcomes on the involved knees after stretching exercise (All $p = 0.000$ for hamstring flexibility, hamstring strength, quadriceps strength, VAS, and AKPS), except neuromuscular control ($p > 0.05$). On the dynamic hamstring stretching groups, there was significantly improved for the hamstring flexibility, knee muscle strength, neuromuscular control, and clinical outcomes on the involved knees after stretching exercise (All $p = 0.000$).

Conclusion: Dynamic hamstring stretching exercise may be more effective to improve the neuromuscular control and clinical outcomes in the PFP patients with inflexible hamstring, compared with static hamstring stretching exercise. Therefore, clinicians and therapists should implement dynamic stretching to improve function and pain when applying stretching exercise in the PFP patients with inflexible hamstring.

Key Words: Dynamic stretching, Static stretching, Hamstring flexibility, Muscle strength, Neuromuscular control

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발목관절의 가쪽들림과 안쪽들림이 하지의 회전과 근활성도에 미치는 영향

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Effects of Ankle Eversion and Inversion on Rotation and Muscle Activation in Lower Extremity

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<Abstract>

Purpose: The purpose of this study was to investigate the consequential changes of arthrokinematics which form both a knee joint and a hip joint muscles and a muscle activation of lower-limb muscles according to the movements of an joint on the frontal plane.

Methods: Dartfish program and Tree EMG 1000 were used to assess the lower extremities alignment and muscle activities by the change of the ankle joint angle in the frontal plane. Thirty subjects were asked to stand statically on the angle-adjustable foot plate for fifteen seconds. In the neutral position, eversion and inversion of the foot obtained by using a foot plate unilaterally tilted 10° or 20°, lower extremities alignment and muscle activities were measured separately and subjects took a rest between each measurement for one minute.

Results: When the muscle activity at the horizontal footrest is compared with eversion of 10° and 20°, vastus medialis, there was a statistically significant difference in tibialis anterior and peroneus longus when compared with inversion of 10° and 20° ($p<0.05$). When the angle of the footrest was changed to eversion and inversion, the results of repeated measurements of the change in angle between thigh and shank, and response-specific comparisons, resulted in significant differences between all angles ($p<0.05$).

Conclusion: The results show that eversion and inversion on the ankle joint in the frontal plane have an effect on thigh and shank rotation and lower extremity muscle activation.

Key Words: Ankle, Inversion, Eversion, Muscle activation

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요가를 활용한 자세 교정 운동이 만성 요통환자의 보행에 미치는 영향

공응경⁺

마음요가 연구소

The Effects of Yoga Posture Correction Exercise using on Gait in Patients with Chronic Low Back Pain

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Center of Mind Yoga

<Abstract>

Purpose: The purpose of this study was to investigate the change of gait posture in patients with chronic low back pain after yoga posture correction exercise.

Methods: We studied 20 patients with chronic low back pain. The motion analysis was conducted to analyze the motions of the subjects during walking, and the sway distance between the bodies was measured. All the subjects walked 5m for the measurement, and motion analysis was performed on the middle 3m except for the distance of 1m from the beginning and the last to reduce the average difference. A total of three walks were analyzed and the average value was used. The intervening method was to determine the distance of change in the body after one hour of yoga posture correction exercise in patients with low back pain.

Results: The gait analysis of patients with chronic low back pain showed statistically significant decrease in the distance between trunks.

Conclusion: Yoga posture correction exercise may be a positive approach for chronic low back pain patients in patients with chronic low back pain.

Key Words: Low back pain, Posture correction exercise, Sway, Yoga

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모션테이핑 적용이 20대 정상 성인의 악력에 미치는 영향

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Effects of Motion Taping on Grip Strength of Normal Adults in 20s

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<Abstract>

Purpose: The purpose of this study was to investigate the changes of grip strength according to taping application method.

Methods: The subjects of this study were 20 normal adult subjects and measured the variables by the group that exercised after taping and the group which exercised without taping. Grip strength was measured using a dynamometer. In the same position, subjects were measured three times. And the average value of three times was used. For the comparison of grip strength according to taping application, we used paired t-test. An independent test was conducted to examine differences between groups before and after intervention.

Results: The results of this study showed the grip strength was statistically significant increasing in the group to which taping was applied. However, there was no statistically significant difference between the groups.

Conclusion: Because there is a difference in grip strength according to the application method of taping, the effect of grip strength can be expected if taping method is applied well.

Key Words: Grip strength, Motion taping, Normal adult

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만성뇌졸중 환자에게 집단운동 프로그램이 균형능력에 미치는 영향

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Effect of group exercise program on balance ability in patients with chronic stroke

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<Abstract>

Purpose: The purpose of this study was to investigate the effects of group exercise program in local rehabilitation center for stroke patients.

Methods: This study was participated 40 patients with chronic stroke. The subjects were divided into two groups of 20 people, one group was performed a group exercise program, and the other group was performed a individual exercise programs. The exercise program was performed twice a week for 8 weeks. The group exercise program consisted of 30 minutes of warm-up, 1 hour of main exercise, 30 minutes of finishing exercise and patient education. In individual exercise program group, patients performed an individual exercise program for 2 hours. The measurement factors were a Berg balance test and a timed up and go test to measure the balance ability that greatly affects the fall of chronic stroke patients.

Results: In both groups, there were significant difference between pre and post intervention in balance scores, and the timed up and go test test. However, in the comparison between groups, there was no statistically significant difference in the case of the Berg balance test, but in the timed up and go test, there was a statistical difference between the groups($p<.05$).

Conclusion: The results of this study showed that the group exercise program had better results in improving the balance ability of chronic stroke patients than the individual exercise program. We suggests that if chronic stroke patients perform exercise programs through community rehabilitation groups or group meetings, they can be provided in an appropriate way to show better improvement in balance ability.

Key Words: Berg balance test, Group exercise, Stroke, Timed up and go test

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만성뇌졸중 환자에게 가슴우리 확장유도 호흡운동이 폐활량과 호흡근력에 미치는 영향

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Effects of Chest Expansion-Induced Breathing Exercise on Vital Capacity and Respiratory Strength in Patients with Chronic Stroke

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<Abstract>

Purpose: The purpose of this study was to investigate the change of respiratory ability according to chest expansion-induced breathing exercise in stroke patients.

Methods: In this study, 24 patients with chronic stroke were participated. Subjects measured changes in vital capacity and changes in respiratory muscles strength through chest expansion-induced breathing exercise. One group had a guided chest expansion-induced breathing exercise, the other group had patients perform autonomous breathing by themselves. Each group consisted of 12 people. Vital capacity was used to measure spirometry and MicroRPM was used to measure respiratory strength.

Results: In case of chest expansion-induced breathing exercise, there was a statistically significant change in vital capacity and respiratory strength after intervention. However, the mean value of the patients who underwent autonomous breathing exercise did not show a statistically significant change in control group.

Conclusion: The results of this study showed that the vital capacity and respiratory strength of chronic stroke patients were increased when expansion-induced breathing exercise was applied. Through this, it can be seen that chest expansion-induced breathing exercise can be effectively used as a respiratory exercise program for chronic stroke patients.

Key Words: Chest expansion-induced breathing exercise, Chronic stroke, Respiratory strength, Vital capacity

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PNF Scapula pattern 운동의 방산효과가 곧은 배근의 최대근력값과 근경직도, 근긴장도에 미치는 영향

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Effects of PNF Irradiation in Scapula Pattern Exercise on Maximum Muscle Strength, Muscle Stiffness and Muscle Tension of Rectus Abdominis

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<Abstract>

Purpose: The study successfully confirmed the effects of one directional exercise of scapular pattern of PNF on (F)frequency, (D)decrement and (S)stiffness in 16 men and women.

Methods: The study has been conducted for 25 days from May 20, 2019 to June 14, 2019, with the scapula pattern exercise being applied 12 times to five sets with theraband. The method of measurements used in the study include myotone pro equipment and an abdominal machine from Cybex. Overall, the measurement has been made before and after the intervention. 1RM was measured before and after intervention using an abdominal machine. Myotone pro was measured three times at 5cm beside both right and left navel before and after the intervention.

Results: According to the results of the study, there was no significant effect on the strength, (F) frequency, (D) decrement, (S) stiffness of rectus abdominis in men. On the other hand, there were significant effects on the strength, (F)frequency, (D) decrement, (S) stiffness of rectus abdominis in women.

Conclusion: This study suggests that it can be applied to elderly people, women who have relatively little movement, and those who have limitations.

Key Words: PNF scapular pattern, Irradiation, Maximum muscle power, Muscle tone, Muscle stiffness

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음악 템포에 따른 균형운동이 정적균형에 미치는 영향

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Effect of Balance Training on Static Balance by Other Tempos of Music

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<Abstract>

Purpose: The purpose of this study was to investigate the effects of music tempo types on the balance ability of 20s students of university.

Methods: The change of balance ability is measured after balance training during listening the fast tempo music, and slow tempo music. Participants wear wireless earphones and hear favorite tempo music on BOSU, two participants throw-and-catch a gymball. Participants take effect this exercise on three days a week, three sets. Overall 3 weeks. Only measured at the beginning and end.

Results: The results of this study showed that the fast music affected the significant increase of the balance ability compared to the slow music. Eventually, the fast music and slow music can't affect to the balance ability.

Conclusion: In this study, fast tempo music was considered to have more positive effect on balance ability than slow tempo, but it did not.

Key Words: Balance training, Static Balance, Music

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모바일 리듬게임이 일반인의 손 민첩성에 미치는 영향

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The Effect of the mobile Rhythm Game on Hand Agility

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<Abstract>

Purpose: The purpose of this study is to enable the agility and discovery of mobile games and hands.

Methods: We studied 36 students of DH university who had no hand function disorder. The control group was divided into 18 subjects and 18 experimental groups. The measurement time was measured using a grooved pegboard. Only the experimental group was applied with intervention. Results were analyzed using SPSS. Comparisons of dexterity by intervention were statistically analyzed by paired t-test.

Results: There were no significant differences ($p>0.05$) in the control group that did not play the mobile rhythm game and no significant differences ($p>0.05$) in the group that played the rhythm game. Rhythmic games were found to be unrelated to the agility of the hands.

Conclusion: There were no significant differences in rhythm games and hand agility in adults with no dysfunction in their hands. Based on this study in the future, we believe that more research will be needed to identify the factors that affect the use of functional hands.

Key Words: Hand agility, Mobile rhythm game, Normal adult

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착지-신장성 수축 훈련이 20대 정상 성인의 점프 높이와 하지 근력에 미치는 영향

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Effect of Balance Training on Static Balance by Other Tempos of Music

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<Abstract>

Purpose: The purpose of this study was to investigate the change of the jumping ability and leg strength in the stretch contraction training performed only in the landing motion.

Methods: The participants in this study were 32 normal 20s. The group was divided into two groups. Each group consisted of eight males and eight females. The experimental group performed only landing-eccentric training without jumping, and the control group performed the depth jump exercise. Three times a week and three weeks were performed. The measurement factors were jump height and 1RM of lower extremity muscle. Independent t-test was used for comparison between groups, and paired t-test was used to analysis the effects of intervention.

Results: The results of this study showed an increase in jump height and leg strength in both control and experimental groups. In comparison between groups, there was no difference in jump height and leg strength in the control and experimental groups.

Conclusion: In this study, we can apply lower limb exercise more easily because the exercise performed by stretching contraction is also comparable to the depth jump exercise, which is known to improve jump ability and strength.

Key Words: Jumping height, Landing-eccentric training, Leg strength

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여성 노인들의 이중과제 보행 시 나이에 따른 수행능력과 반응시간 변화

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Changes in performance ability and reaction time according to age in walking of dual tasks of elderly women

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<Abstract>

Purpose : The purpose of this study was to investigate the changes in performance and response time when walking with a double task in elderly women people over 65 years of age.

Methods : In this study, 30 elderly women aged 65 or older were studied. The subjects walked, looked at the calculations, answered the calculations. And they had the intermediate experimenter perform another task. Measures of performance were made with respect to the results of the calculations and the ratio between correct and incorrect answers. Response rate and reaction time were measured through a total of 7 walking trials. In addition, the walking speed was measured. In the case of the reaction time, the execution time for another task given in the middle of walking was measured. Regression analysis was used to analyze performance and response time according to the age of the subjects.

Results : There was a significant difference in performance and response time according to age. Higher age showed lower performance and longer response time. As the age increases, the slower the walking speed when performing the double task.

Conclusion : In elderly women aged 65 or older, the ability to perform double tasks decreases with walking. In addition, the walking speed is also slowed down, so it may be difficult to walk with double tasks. In 65-year-old women elderly, as the age increases, the ability to deal with the dual tasks decreases. So 65-year-old women should be careful when walking with double tasks.

Key Words : Double tasks, Elderly women, Walking

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