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자세패턴과 관련된 국내 연구동향 분석

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Research Trends of Posture Pattern in Korea Literature

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Objectives : The purpose of this study was to analyze trends of posture pattern in Korean literature.

Methods : We searched four Korean databases (NDSL, RISS, OASIS, and KISTI) and classified the studies according to publication year and the study type. Additionally, we analyzed clinical research papers according to the predominant reported posture pattern, the type of study, assessment for clinical outcomes.

Results : In total, 50 published studies were included in our analysis, and we determined the following: By study type, there were 37 interventional studies, 6 observational studies and 7 non-clinical research papers. In the interventional studies, the most common posture pattern was the forward head posture pattern, which was investigated in 22 studies. As a tool for evaluating posture pattern, cervical vertebral angle and the height of the scapula inferior angle are used most.

Conclusions : Although this study has provided insight into the commonly investigated posture patterns types in Korean clinical studies, further research is required and future studies should include randomized controlled trials and systematic reviews in their analyses.

Key words : Posture, Posture pattern, Posture type, Somato type

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Ⅰ. 서 론

최근 자세에 대한 관심이 높아지면서 바른 자세의 외형적인 아름다움뿐만 아니라 신체 기능상의 의미에 대해서도 그 가치가 높아지고 있다[1]. 자세가 바르지 않은 경우 가볍게는 둥근어깨(round shoulder)나 거북목(foward head)과 같이 외적인 아름다움과 건강미를 해치는 수준이지만, 이러한 자세가 지속되면 근골격계에 점진적인 변화를 가져와 만성적인 통증의 원인이 되며, 어깨충돌증후군(impingement syndrome)과 같은 해당 관절질환뿐 아니라 전신의 구조적 정렬에 영향을 미쳐 척추측만증, 추간판의 퇴행성 변화에까지 이르게 된다[2,3].

이러한 근골격계 질환에 대한 기존의 전통적인 접근법은 해부학적인 면에 집중하여 병리적 구조를 개선시키는 방법이었는데. 이러한 전통적인 접근법으로 시도하였으나 치료가 되지 않는 경우나 병리적 구조에 대한 진단학적 검사(X-ray, MRI) 결과가 불분명한데 통증이 지속되는 경우 등 전통적 접근법에 대한 한계가 드러나게 되었고[4], 통증 및 기능장애에 대한 원인을 해당 국소부위가 아닌 전체적인 시각에서 접근하려는 노력이 시도되었다[5].

한의학계 내에서도 근골격계 질환에 대해 기존의 해부학적인 접근에서 벗어나 인체를 전체적인 시각에서 기능적인 관점으로 보려는 추세이며, 특히 이러한 자세이상과 인체 정렬의 부조화를 패턴화시켜 전신적으로 접근하려는 시도가 이루어지고 있다. 박 등[6]은 full spine X-ray를 이용하여 성인 91명의 자세 분석을 통해 Kendell의 측만패턴[7]과 Zink의 근막보상패턴[8]에 대하여 검증하고자 하였으며, 김 등[9]도 20명의 오른손잡이의 자세를 분석하여 측만패턴에 대하여 확인한 후 추나치료의 효과를 검증하였고, 최 등[10]은 Myers가 제시한 인체를 연속된 근막들의 구조적 통합체로 인식하는 근막경선이론[11]을 이용한 치료법의 효율성에 대하여 고찰하는 등 다양한 이론을 통하여 자세패턴을 분류하고 이에 대한 연구가 진행되고 있다.

하지만 기존의 연구에 대하여 정리하거나 경향성을 파악하려는 논문은 부족한 실정으로, 이에 저자는 자세패턴에 대하여 최근 5년 내에 개재된 국내 학술 논문들의 문헌고찰을 통하여 국내의 최신 연구 동향을 관찰하여 앞으로의 연구에 도움이 되고자 한다.

Ⅱ. 대상과 방법

1. 연구대상

자세패턴에 대한 국내 문헌 검색을 위해 국내 온라인 데이터베이스를 활용하여 조사하였다.국가과학기술정보센터(www.ndsl.kr), 한국교육학술정보원(www.riss.kr), 전통의학정보포털(oasis.kiom.re.kr), 한국과학기술정보연구원(www.kisti.re.kr) 를 이용하였으며, 검색어는 '자세', '체형', '패턴', '유형', 'posture', 'somato type' 등의 단어를 조합하였고, 최신 연구 동향을 관찰하기 위하여 2015년부터 2019년 5월까지 발표된 논문으로 대상을 제한하였다.

2. 연구방법

검색된 논문의 제목 및 초록을 검토하였으며, 초록의 내용이 불분명한 경우에는 원문을 분석하였다. 중복 검색된 논문, 관련이 없거나 관련성이 적어 본 논문에 적합하지 않은 논문은 제외하였다. 최종적으로 선정된 논문에 대해서는 기존의 연구 분석 방법을 참고하여 연도별 분류, 논문 유형 및 내용으로 나누어 분석을 진행하였다[12,13].

Ⅲ. 결 과

1. 자료 선별

4개의 데이터베이스에서 상기 검색으로 검색된 논문은 총 612편이었으며, 중복 검색된 논문 29편과 임상적인 관련이 없는 논문 450편, 원문 확보가 어려운 논문 8편을 제외하였다. 이후 자세패턴과 직접적인 관련이 없는 논문 65편을 제외하여 최종적으로 50편의 논문이 최종 분석 대상으로 선별되었다(Fig. 1)(Appendix Ⅰ).

2. 선정 논문의 분석

1) 발표 연도별 분류

최종 선정된 50편의 논문을 연도별로 분석한 결과 2015년에 6편, 2016년에 12편, 2017년에 15편, 2018년에 14편, 2019년에는 3편이 발표되었다.

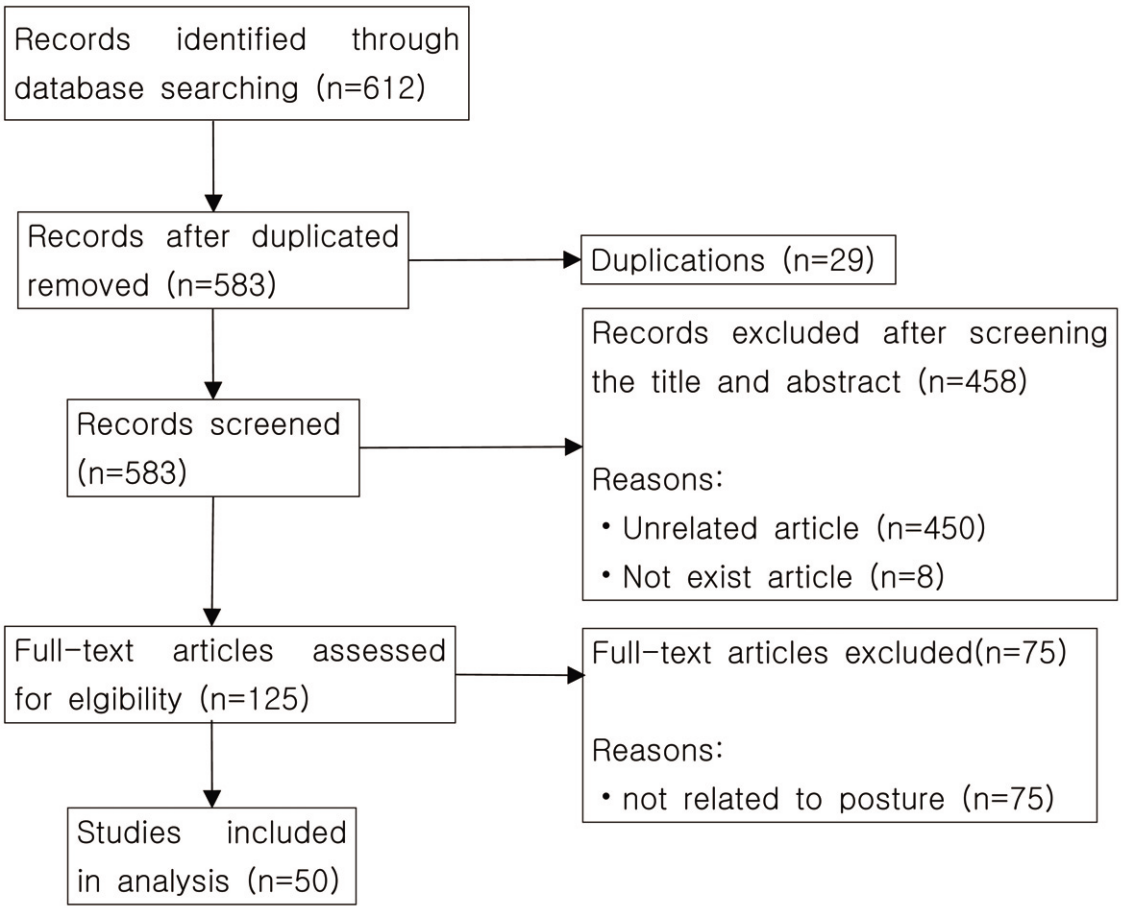

Fig. 1. A flow chart decribing the trial selection process .

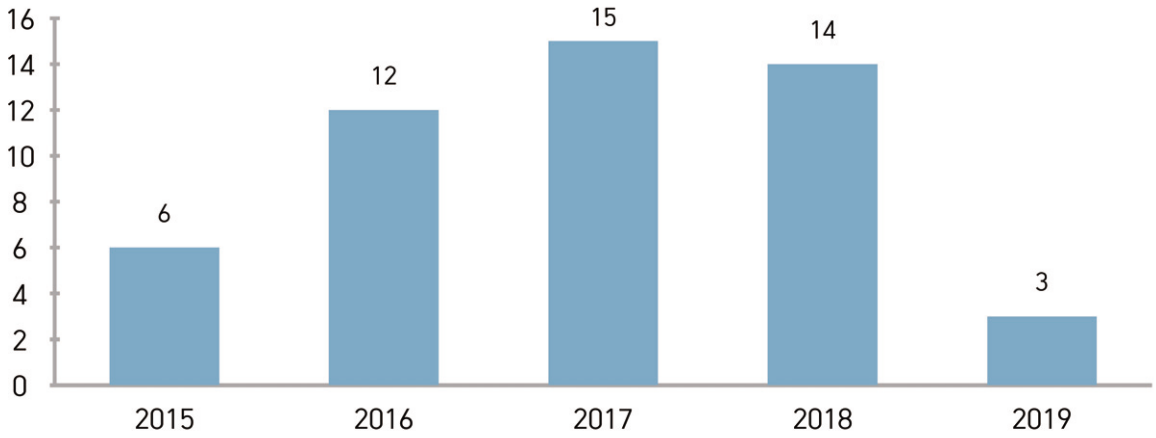

Fig. 2. The number of the theses sorted by published year.

2) 논문 유형별 분류

연구방법에 따라 총 50편의 논문을 분류한 결과 임상연구논문이 43편으로 대다수를 차지하였다. 임상연구논문 중 중재연구가 37편으로 가장 많았으며, 관찰연구는 6편이었다. 그 외 기타로 분류된 논문은 7편 이었다.

(1) 중재연구(intervention study)

중재연구 37편은 특정한 자세 패턴에 대해 중재를 이용한 효과를 보는 연구가 대다수로 전방머리 자세에 대한 연구가 22편으로 가장 많았고, 굽은어깨 자세에 대한 연구와 측만증에 대한 연구는 각각 3편이었다. 전방머리 자세와 굽은어깨 자세를 함께 보는 연구는 2편, 오른손잡이의 자세패턴에 대한 연구는 1편이었으며 그 외에 인체의 전반적인 정렬에 대한 연구는 6편이었다. 가장 많이 사용된 중재방법은 운동으로 총 29편의 논문에서 단독 또는 복합적인 중재로 활용되었으며, PNF 패턴 운동[14,17,20,34], 호흡 운동[23,28,39,43], 볼링[14], 플렉시바 운동[16], 한발 자전거운동[27], 폼롤러 및 탄력밴드 운동[36], 팔굽혀펴기[29] 등 다양한 종류의 운동이 사용되었다. 운동 외의 중재로는 도수 치료[15,17,18-9,34], 추나[9], 테이핑[36-7,40] 등이 있었다. 임상시험의 결과를 나타내는 지표로는 견갑골 하각, 장골능과 같은 해부학적 지표의 높이, 경부장애지수, 머리척추각, 관절가동범위가 주로 사용되었으며, 그 외 근육의 두께 및 활성도, 족저 압력분포, 폐활량 등도 결과를 나타내는 지표로 사용되었다(Table Ⅰ).

(2) 관찰연구(observational study)

관찰연구는 총 6편으로 정상자세와 머리전방자세 사이의 호흡능력의 차이를 비교한 연구[50], 근골격계 통증 환자의 통증유형과 신체지표와의 관련성을 보려는 연구[51], 스마트 폰을 사용하는 자세에 따른 자세패턴의 변화를 비교한 연구[52], 정상 대학생들의 성별에 따른 인체 정렬의 차이를 보려는 연구[53], 정상 대학생들의 비만도에 따른 인체 정렬의 차이를 보려는 연구[54], 척추측만 정도와 경추자세와의 관련성을 보려는 연구[55]가 있었다(Table Ⅱ).

Table Ⅰ. Details of Intervention Studies

No.	Author (year)	Posture pattern	Intervention	Control	Main Outcomes	Results
1	Choi et al. (2015)[14]	Scoliosis	A: PNF exercise (n=20) B: Bowling exercise (n=20)	B: None (n=0)	1) Trunk inclination 2) Side Deviation	1),2) statistically significant decreased
2	Lee et al. (2015)[15]	Forward head	A: Passive exercise and manual cervical traction (n=13) B: Mulligan technique (n=13) C: Active exercises (n=13)	D: None (n=0)	1) Cranial rotation angle 2) Cervial vertebral angle 3) Cervical lordosis angle	1),3) statistically significant difference in A,B 2),3) statistically significant difference in A,C 1),3) statistically significant difference in B,C 1) statistically significant decreased in B 2) statistically significant increased in C 3) statistically significant increased in B
3	Um et al. (2015)[16]	Scoliosis	A: Flexi bar exercise (n=10)	B: None (n=10)	1) Height difference of both acromions, scapular inferior angles, iliac crest apexs, head of ulnas 2) Angle difference of both acromions, acromions, scapular inferior angles, iliac crest apexs, head of ulnas	1),2) statistically significant difference
4	Oh et al. (2015)[17]	Forward head	A: Chiropractic (n=10) B: PNF exercise (n=10) C: Chiropractic and PNF exercise (n=10)	D: None (n=0)	1) Visual analog scale 2) Neck disability index 3) Heart rate variability	1),2),3) statistically significant improved 1) significantly improved in C more than A,B 2) significantly improved in C more than A
5	Kim et al. (2016)[18]	Round shoulder	A: Mulligan technique (n=9) B: Mulligan technique with taping (n=9)	B: None (n=0)	1) Range of motion 2) Scapula posture	1),2) statistically significant difference
6	Lee et al. (2016)[19]	Round shoulder	A: Thoracic spine thrust manipulation (n=15)	B: None (n=15)	1) Range of motion 2) Visual analog scale 3) Rounded shoulder posture	1) statistically significant increased 2) statistically significant decreased 3) decreased but no statistically significant difference

No.	Author (year)	Posture pattern	Intervention	Control	Main Outcomes	Results
7	Oh et al. (2016)[20]	Forward head	A: PNF exercise (n=20)	B: None (n=19)	1) Cranial rotation angle 2) Anterior weight bearing 3) Range of motion 4) Neck disability index	1),2),3),4) statistically significant difference
8	Park et al. (2016)[21]	Forward head	A: Cranio-cervical flexion exercise (n=17)	B: None (n=0)	1) Thickness of longus colli muscle 2) Thickness of sternoclei-domastoid muscle	1),2) statistically significant difference
9	Yoo et al. (2016)[22]	Forward head	A: Therapeutic exercise (n=2)	B: None (n=0)	1) Visual analog scale 2) Neck disability index 3) Range of motion 4) Foward head posture	1),2),4) statistically significant decreased 3) statistically significant increased
10	Bae et al. (2017)[23]	Forward head	A: Diaphragmatic breathing exercise (n=10) B: Abdominal drawing-in exercise (n=10) C: Abdominal expansion exercise (n=10)	D: None (n=0)	1) Foward head posture 2) Sternocleidomastoid muscle activity 3) Scalenus anterior activity 4) Splenius capitis activity	1) statistically no significant difference 2) statistically significant difference in A,C 3) statistically significant difference in C 4) statistically significant difference in B,C
11	Kim et al (2017)[24]	Forward. head	A: Shoulder stabilization (n=10) B: Thoracic extension exercise (n=10)	C: Deep neck flexor exercise (n=10)	1) Neck disability index 2) Cervial vertebral angle 3) Cranial rotation angle 4) Cervical lordosis angle	1) statistically significant decreased in A,B 2),3) statistically significant difference in A,B 4) statistically no significant difference
12	Lee et al. (2017)[25]	Forward head	A: Complex exercise (n=4)	B: None (n=0)	1) Cervial vertebral angle 2) Cranial rotation angle 3) Numeric pain rating scale 4) Neck disability index 5) Toe out angle 6) Fore foot/Rear foot peak pressure ratio 7) Static balance ability	1),2),3),4) decreased in all subjects 5),6) increased in all subjects 7) improved in all subjects
13	Lee et al. (2017)[26]	Forward head	A: Cranio-cervical flexion exercise (n=10) B: Rectus abdomicos massage (n=10)	C: Stretching (n=10)	1) Cervial vertebral angle 2) Visual analog scale 3) Neck disability index	1),2),3) statistically significant difference in A,B
14	Park et al. (2017)[27]	Forward head	A: Unicycle exercise (n=4)	B: None (n=0)	1) Cervial vertebral angle 2) Cranial rotation angle	1),2) statistically significant difference

No.	Author (year)	Posture pattern	Intervention	Control	Main Outcomes	Results
15	Gwak et al. (2017)[28]	Forward head, Round shoulder	A: Respiration exercise (n=15) B: Stretching exercise (n=15)	C: None (n=0)	1) Forced Vital Capacity 2) Forced expiratory volume in 1 second 3) Vital capacity 4) Inspiratory capacity	1),2),4) statistically significant difference in A 3) statistically no significant difference in A 2),3),4) statistically significant difference in B 1) statistically no significant difference in B
16	Yoon et al. (2017)[29]	Forward head	A: Knee push-up using sling exercise (n=8)	B: Knee push -up exercise (n=8)	1) Cervial vertebral angle 2) Cranial rotation angle 3) Forced Vital Capacity 4) Forced expiratory volume in 1 second	1),2),3),4) statistically significant difference
17	Kim. (2017)[30]	Forward head	A: Forward head (n=9) B: Turtle neck (n=9)	C: None (n=0)	1) Fear-avoidance beliefs questionnaire 2) Neck disability index	1) statistically significant decreased in A,B 2) statistically no significant difference
18	Han et al. (2017)[31]	Forward head	A: Lumbar stabilization exercise (n=12)	B: None (n=15)	1) Left and right balance 2) Shoulder height 3) Neck posture	1) increased but no statistically significant difference 2),3) statistically significant difference
19	Park et al. (2017)[32]	Scoliosis	A: Complex exercise (n=41)	B: None (n=0)	1) Rotation angle of pelvis 2) Side angle of the spine	1),2) statistically significant difference
20	Han et al. (2017)[33]	Forward head	A: Complex exercise (n=19)	B: None (n=18)	1) Shoulder height 2) Left and right balance 3) Neck posture	1) decreased but no statistically significant difference 2) statistically significant increased 3) statistically significant decreased
21	Kim et al. (2017)[9]	Right-handed	A: Chuna treatment (n=20)	B: None (n=0)	1) Shoulder height 2) Pelvic height 3) Knee angle 4) Leg length difference 5) Left and right balance 6) Scapula inferior angle 7) Angle of cervical spine	1),2),4) statistically significant improved 3),5),6),7) improved but no statistically significant difference
22	Oh et al. (2017)[34]	Forward head	A: Chiropractic (n=10) B: PNF exercise (n=10) C: Chiropractic and PNF exercise (n=10)	D: None (n=0)	1) Lumbar lordosis angle 2) Pelvic height	1),2) statistically significant difference

No.	Author (year)	Posture pattern	Intervention	Control	Main Outcomes	Results
23	Kim et al. (2018)[35]	Round shoulder	A: Foam roller exercise (n=15) B: Theraband exercise (n=15) C: Shoulder stability exercise (n=15)	D: None (n=0)	1) Shoulder height 2) Forward shoulder angle 3) Forward head angle 4) Foot pressure	1),2),3) statistically significant difference 4) statistically no significant difference in C
24	Kim et al. (2018)[36]	Forward head	A: Kinesio taping (n=18)	B: None (n=0)	1) Plumb line 2) Cervial vertebral angle 3) Posterior cervical muscle tension	1),2),3) statistically significant difference
25	Park et al. (2018)[37]	Forward head, Round shoulder	A: Dynamic taping (n=18)	B: None (n=0)	1) Plumb line 2) Cervial vertebral angle 3) Posterior cervical muscle tension	1),2),3) statistically significant difference
26	Yang et al. (2018)[38]	Postural alignment	A: Mental exercise (n=15)	B: General exercise (n=15)	1) Ankle height 2) Knee height 3) Pelvic height	1),3) statistically significant difference 2) significantly improved in A more than B
27	Kim et al. (2018)[39]	Postural alignment	A: Schroth exercise (n=8)	B: None (n=0)	1) Ankle height 2) Knee height 3) Pelvic height	1),3) statistically significant difference 2) significantly improved in A more than B
28	Oh et al. (2018)[40]	Forward head	A: Mulligan taping (n=15)	B: None (n=15)	1) Forearm muscle activation 2) Grip strength	1),2) statistically 1),2) statistically significant difference
29	Kim et al. (2018)[41]	Postural alignment	A: Exercise (n=27) B: Orthotics (n=27) C: Exercise and Orthotics (n=27)	D: None (n=27)	1) Cervial vertebral angle 2) Pelvic tilt	1),2) statistically significant difference
30	Park et al. (2018)[42]	Forward head	A: Corrective exercise and TECAR treatment (n=15)	B: Corrective exercise (n=15)	1) Cervial vertebral angle 2) Pressure pain threshold 3) Visual analog scale 4) Neck disability index	1),2),3),4) statistically significant difference
31	Choi et al. (2018)[43]	Postural alignment	A: Breathing exercise (n=16)	B: None (n=12)	1) Head tilt 2) Shoulder height 3) Pelvic height 4) Knee height 5) Ankle height 6) Knee distance	1),2),3),4),5) statistically no significant difference 6) statistically significant improved
32	Kim et al. (2018)[44]	Postural alignment	A: Overhead squat exercise (n=10) B: Squat exercise (n=10)	C: None (n=12)	1) Shoulder height 2) Pelvic height 3) Cervical angle 4) Pelvic tilt 5) Scapula height	1),2) statistically no significant difference 3),4),5) statistically significant difference in A
33	Park et al. (2018)[45]	Postural alignment	A: Climbing training (n=15)	C: None (n=15)	1) Trunk imbalance 2) Pelvic tilt 3) Center of pressure	1),3) statistically significant difference 2) statistically no significant difference

No.	Author (year)	Posture pattern	Intervention	Control	Main Outcomes	Results
34	Shin et al. (2018)[46]	Forward head	A: Unstable surface exercise (n=10) B: stable surface exercise (n=10)	C: None (n=10)	1) Cervical lordosis angle 2) Anterior weight bearing 3) Range of motion 4) Forced Vital Capacity 5) Forced expiratory volume in 1 second	1) statistically significant difference in A 2),4),5) statistically significant difference in A,B 3) statistically significant difference
35	Kim et al. (2019)[47]	Forward head	A: Muscle relaxation therapy (n=8) B: Joint movement therapy (n=8) C: Muscle relaxation and joint movement therapy (n=8)	D: None (n=0)	1) Age 2) Cervical vertebral angle 3) Working time 4) Neck extension 5) Neck side bending 6) Neck rotation 7) Head disability index 8) Neck disability index	1),2),3) statistically no significant difference 4),5),6),7),8) statistically significant difference
36	Choi et al. (2019)[48]	Forward head	A: Mckenzie exercise (n=8)	B: None (n=8)	1) Neck posture 2) Neck disability index	1),2) statistically significant difference
37	Kim et al. (2019)[49]	Forward head	A: Neck stabilization exercise (n=20)	B: None (n=8)	1) Visual analog scale 2) Cervical vertebral angle 3) Jitter 4) Shimmer	1),2),3),4) statistically significant difference

3) 기타

그 외의 논문은 7편으로 발레가 인체 정렬에 도움이 되는 것을 확인하고 이를 활용하여 바른 자세 교육 프로그램을 제시한 연구 1편[56]과 X-ray를 통하여 자세패턴 변화가 나타나는 단계를 고찰한 연구 1편[57], 자세패턴을 분석하기 위한 도구 개발에 대한 연구 5편[58-62]이 있었다.

Ⅳ. 고 찰

바른 자세란 인체가 받는 스트레스를 최소화할 수 있는 근골격계의 올바른 정렬을 의미하며, 건강한 아름다움을 추구하는 현대인들에게 바른 자세가 갖는 의미는 날로 높아지고 있다[1]. 하지만 현대 산업의 발달은 컴퓨터 작업, 장시간의 운전과 같은 정적이고 반복적인 업무형태와 만성적인 운동부족과 같은 습관을 야기하였고[63], 이러한 습관으로 인해 점차 근육간의 불균형이 심해져 이는 자세 패턴이 변화시켜 만성적인 통증과 관절의 퇴행과 같은 근골격계 질환으로 악화되었다[12]. 이러한 근골격계 질환에 대한 기존의 접근법은 주로 해부학적으로 접근하여 병변 부위의 구조적인 문제를 해결하는데 맞춰져 있었지만 구조적 문제를 해결함에도 불구하고 통증이 지속되거나, 구조적 문제에서 원인을 찾을 수 없는 것에 대해서 기존의 접근법에 대한 한계가 생겨 점차 기능적인 문제에 대하여 주목하게 되었다[4].

한의학계 내에서도 김[19]은 여러 검사에서 구조적 문제를 밝힐 수 없는 통증에 대하여 기존의 해부학에 치중한 근골격계 질환에의 접근에 한계를 역설하고, 근막구조의 경결을 원인으로 보아 기능적으로 접근하려 하였으며, 자세패턴에 관해서는 박 등[6]은 영상검사를 통해 Kendell의 측만패턴[7]과 Zink의

Table Ⅱ. Details of Observational Studies

No.	Author (year)	Group	Metrics	Results
1	Han et al. (2015)[50]	n=14 Forward head posture group n=14 Normal group	1) Forced vital capacity 2) Forced Expiratory Volume in One Second 3) 1)/2) ratio 4) Maximal Voluntary Ventilation	Expiratory ability was statistically significant decreased in forward head posuture group more than normal group
2	Park et al. (2015)[51]	n=164 Musculoskeletal patients	1) Sex 2) Age 3) Chief complain 4) Body parameters	There was not a significant difference between genders from the characteristics of gender based body parameters expect for the statistical difference in Q angle. There was a significant correlation between low back pain and multiple response status. There was a significant correlations between knee pain and Q angle. There was a significant correlations between pelvic pain and posture balance of ankle.
3	Moon et al. (2016)[52]	n=15 Students using smart phone more than 3 hours	1) Vertebral angle 2) Pelvic tilt	Using smart phone in standing position showed the possibility to make worse on the fore head posture. Using smart in sitting position and sitting position leaning back showed the possibility to make negative effect on the lumbar vertebral.
4	Han et al. (2016)[53]	n=70 Normal students (37 Male, 33 Famale)	1) Differences of leg length 2) Shoulder gradient 3) Left and right balance 4) Neck posture	There was no statistically significant difference in Differences of leg length, 4 Shoulder gradient, left and right balance, Neck posture between male and female.
5	Lee et al. (2016)[54]	n=32 Obesity group n=48 Normal group	1) Differences of leg length 2) Shoulder gradient 3) Left and right balance 4) Neck posture	Left and right balance was statistically significant difference but there was no statistically significant difference in differences of leg length, shoulder gradient, neck posture
6	Kim et al. (2017)[55]	n=90 Scoliosis group	1) Cobb's angle 2) Neck posture	Cervical posture showed significant according to cobb's angle. Cervical posture were significantly higher with increasing angle of scoliosis. Cobb's angle showed significant positive correlation with cervical posture.

근막보상패턴[8]에 대해서 검증하고자 하였고, 신 등[20]은 Myers의 근막경선 이론[11]에 따라 근육사이의 연관성에 대해서 검증하고자 하는 등 다양한 이론을 통하여 자세패턴에 대해 관심을 갖고 연구가 진행되고 있다.

하지만 기존의 연구를 통하여 자세패턴 연구의 경향성을 파악하려는 논문은 부족한 실정으로, 이에 저자는 최근 5개 년도에 개재된 자세패턴에 대한 논문을 바탕으로 국내의 최신 연구 동향을 관찰하여 앞으로의 연구에 도움이 되고자 하였다.

4개의 국내 온라인 데이터베이스를 이용해 '자세', '체형', '패턴', '유형', 'posture', 'somato type' 등의 단어를 조합하여 2015년부터 개재된 논문을 바탕으로 검색한 후 최종적으로 50편의 논문을 선정하였다.

최종 선정된 50편의 논문을 연도별로 분석한 결과 2015년에 6편, 2016년에 12편, 2017년에 15편, 2018년에 14편, 2019년에는 3편이 발표되었다. 본 연구에 박 등[64]의 연구를 참고하였을 때, 자세패턴에 대한 관심이 지속적으로 증가해왔으며, 특히 2016년 이후로 더 많은 관심을 받고 있음을 알 수 있었다.

논문의 유형별로 분류하였을 때, 50편의 논문 중 임상연구논문이 43편이었으며, 이 중 중재연구가 37편으로 대다수를 차지하였으며, 나머지 6편은 관찰연구였다.

중재연구는 대부분 특정한 자세 패턴에 대해 중재를 통한 효과를 보는 연구로 특히 전방머리 자세에 대한 연구가 22편으로 전체 중재연구의 59%를 차지하여 다른 자세 패턴에 비해 관심이 편중되어있는 것을 확인할 수 있었다. 전방머리 자세는 Janda가 제시한 교차증후군에 기반을 둔 자세패턴이다. 그는 근육을 긴장하거나 구축되려는 경향을 가진 근육과 약해지거나 길어지려는 경향을 가진 근육으로 분류하였고, 이러한 근육의 불균형으로 인해 상부 승모근, 견갑거근, 대흉근, 소흉근 긴장의 교차와 심부경부 굴곡근, 중·하부 승모근의 약화가 교차하여 결과적으로 전방머리 자세나, 굽은 어깨와 같은 자세 패턴이 나타난다고 하였다[4]. 자세 패턴과 관련된 이론으로는 Janda의 교차증후군 외에도 근막의 방향성으로 인하여 후두-환추 이행부의 좌하방, 경흉추 이행부의 우하방, 흉요추 이행부의 좌하방, 요천추 이행부의 우하방 자세패턴이 나타남을 제시한 Zink의 일반보상패턴[4], 근육이 근막을 통하여 연결이 되어 있으며, 이러한 근육근막 간에 주행경로를 통하여 자세패턴이 나타남을 제시한 Myers의 근막경선이론[11] 등 다양한 이론이 존재하지만, 본 연구에서는 교차증후군애 근거한 전방머리자세 외에 주로 쓰는 손에 의하여 측만패턴이 나타남을 제시한 Kendell의 이론[7]에 근거하여 추나치료의 효과를 연구한 1례[9] 만이 조사되어 다양한 이론에 근거한 자세패턴 분석에 대한 아쉬움이 남는다. 중재방법은 PNF 패턴 운동, 호흡 운동, 도수 치료, 추나, 테이핑 등 다양한 방법으로 이루어졌으며 모든 연구에서 머리척추각, 견갑골 하각의 높이 등 자세패턴 관련 지표가 효과적으로 나타났으나, 자세 패턴을 측정하는 지표에 있어 한계점이 있다고 생각된다. 대부분의 논문에서 자세 패턴을 평가하는 도구로 X-ray를 통한 각도의 측정이나 카메라와 마커를 활용한 자세측정장비를 이용하였는데, 이는 해부학적 지표를 이용한 단순 측정에 불과해 자세패턴으로 인하여 변화된 근육과 같은 연부조직의 상태를 파악하기에는 무리가 있다. 추후 자세패턴과 관련된 연부조직의 상태도 파악할 수 있는 측정장비가 개발되어 자세패턴의 진단 및 치료에 도움이 되길 기대한다.

관찰연구는 총 6편으로 스마트 폰을 사용하는 자세에 따른 자세 패턴의 변화를 비교하거나, 비만도에 따른 인체 정렬의 차이를 보는 등 다양하게 이루어 졌으며, 앞으로도 현대 산업의 발달로 인하여 생기는 만성적인 운동부족이나 잘못된 자세와 같이 더욱 많은 연구가 진행되어야 할 것으로 사료된다.

또한 임상연구 43편 중 대조군을 설정한 연구는 20편으로 더 나은 연구의 질을 위해서는 대조군을 설정한 연구가 더 많아져야 할 것이며, 무작위 대조

군 연구나 체계적 문헌고찰과 같은 형태의 논문은 조사되지 않아 앞으로 근거 수준을 높이기 위한 노력이 필요하다고 생각된다.

이상으로 본 연구를 통해서 지금까지 국내에서 자세패턴에 대해 어떠한 경향의 연구가 행해졌는지 분석하여 앞으로의 연구에 도움이 되고자 하였다. 현재까지 자세패턴과 관련된 연구는 주로 물리치료 관련 학회에서 이루어지고 있어 본 연구를 통해 앞으로 한의학계에서의 더 많은 관심과 다양한 방향으로의 연구가 진행되기를 기대한다.

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Appendix Ⅰ. Published Year and Subject, Title of Journal

Published Year	Subject	Title of Journal
2015	Effect of Active Intervention after Kaltenborn's Cervical Joint Mobilization on The Cervical Spine Alignment and Muscle Activity in Patients with Forward Head Posture	J Korean Soc Phys Med
2015	Comparison of Forced Vital Capacity and Maximal Voluntary Ventilation Between Normal and Forward Head Posture	J Korean Soc Phys Med
2015	Research of Body Parameters Characteristics from Posture Analysis of Musculoskeletal Problem Patient	The Journal of Korea CHUNA Manual Medicine for Spine & Nerves
2015	A Comparison between Integrated Patterns of PNF and Bowling Exercises	Journal of Korea Proprioceptive Neuromuscular Facilitation Association
2015	Effect of Flexi-bar exercise on postural alignment and balance ability in juvenile soccer players	Journal of the Korea Academia-Industrial
2015	Effects of Chiropractic and PNF Exercise on Pain Self-Awareness and Autonomic Nervous Function in Forward Head Posture Patients	The Korean Journal of Physical Education
2016	Effects of Modifed Muligan Technique acompanied by Taping on the Scapular Posture and Shoulder Range of Motion of Stroke Patients	Journal of Korean academy of orthopaedic manual therapy
2016	Effect of PNF Neck Patterns on Neck Movement and NDI in Adults with Forward Head Posture	PNF and Movement
2016	Effects of Combined Treatment of Chiropractic and PNF Exercise on Musculoskeletal Function in Forward Head Posture Patients	Korean Journal of Sport Science
2016	The study for the potential injury of spinal column on using the smart phone with the posture	The Korea Journal of Sports Science
2016	A Comparative Analysis on the Differences of Leg Length, Shoulder Gradient and Forward Head Posture in University Students	The Korea Journal of Sports Science
2016	The Effect of the Difference of Leg Length in Obese College Students on Shoulder Gradient, balance and Forward Head Posture	The Korea Journal of Sports Science
2016	Effect of the Head Support on a Change in Muscle Thicknes for Longus Coli and Sternocleidomastoid During Cranio-Cervical Flexion Test in Subjects With Forward Head Posture	Phys Ther Korea
2016	Effects of Therapeutic Exercise on Posture, Pain and Asymmetric Muscle Activity in a Patient with Forward Head Posture: case report	J Korean Soc Phys Med
2016	Radiological Evaluation and Classification of Adult Spinal Deformity	J Korean Orthop Assoc
2016	The Development of Forward Head Posture Measurement Module based on Flex Sensor	The Institute of Electronics and Information Engineers

Published Year	Subject	Title of Journal
2016	The Wearable Sensor System to Monitor the Head & Neck Posture in Daily Life	Journal of Biomedical Engineering Research
2016	Device Design for Forward Head Posture Prevention through Anthropomorphization	The HCI Society of Korea
2017	Effects of Breathing Methods on Neck Muscle Activation in Subjects with a Forward Head Posture	PNF and Movement
2017	The Effects of Shoulder Stabilization and Thoracic Extensor Exercises Combined with Deep Neck Flexor Exercise on Posture and Pressure Pain Threshold of Physical Therapist and Occupational Therapist with Turtle Neck Syndrome	Journal of Korean academy of orthopaedic manual therapy
2017	The Effects of Complex Exercise Program on Postural Change, Gait and Balance Ability in Elementary School Students with Forward Head Posture-Case Study	Journal of Korean academy of orthopaedic manual therapy
2017	The Effect of Rectus Abdominis Functional Masage on Forward head posture and Pain in Patients with Chronic Neck Pain	Journal of Korean academy of orthopaedic manual therapy
2017	Effects of Unicycle Exercise for 8 Weeks on the Turtle Neck Posture in University Students	Archives of Orthopedic and Sports Physical Therapy
2017	The Effect of The Feedback Respiration Exercise and Stretching Exercise on The Pulmonary Function of Forward Head Posture and Round Shoulder Patient	The journal of Korean academy of cardiorespiratory physical therapy
2017	Effect of push up plus on sling and stable surface on muscle activity and lung function in adults with forward head posture	Journal of the Korea Academia-Industrial
2017	Comparison of Effect of Combined Exercise Training on Fear-Avoidance Beliefs Questionnaire and Neck Disability Index in Forward Head Posture and Turtle Neck	Journal of the Korea Entertainment Industry Association
2017	The Effect of Lumbar Stabilization Exercise on Postural Balance, Shoulder Gradient and Forward Head Posture in College Students	Korean Journal of Sports Science
2017	Effects of Asymmetry Improving on Complex Intervention Exercise for Posture Stabilization of Adolescent Idiopathic Scoliosis	The Korea Journal of Sports Science
2017	The effect of Cobb's Angle on Cervical Posture according to Scoliosis Levels	The Korea Journal of Sports Science
2017	The Effect of Combined Exercise Program on Balance, Shoulder Gradient and Forward Head Posture in College Students	The Korea Journal of Sports Science
2017	Posture Analysis of Healthy Right-handed Male and the Effect of Chuna Treatment	Journal of Korean Medicine Rehabilitation

Published Year	Subject	Title of Journal
2017	Effects of Combined Treatment of Chiropractic Therapy and PNF Patterns on Spinal Alignment and Physique in Forward Head Posture Patients	Journal of the Korean society for Wellness
2017	Development and Application of a Posture Education Program Using Ballet in Elementary School	Official Journal of Korean Society of Dance Science
2018	The Effects of Exercise Program Using Props for Rounded Shoulder on Posture, Balance Index, Gait Pattern	The Journal of Korean Society for Neurotherapy
2018	Immediate influence of aplication of Kinesio Taping on forward head posture	The Journal of the Convergence on Culture Technology
2018	Effects of Ankle Exercise combined with Mental Practice on Postural Alignment	Journal of The Korean Society of Integrative Medicine
2018	The Effects of Schroth Exercise on Postural Alignment of Sagital Plane in the Visualy Impaired Students	Journal of Korean academy of orthopaedic manual therapy
2018	The Effects of Shoulder Mulligan Taping and Repeated Measurements on Wrist Flexor Muscle Activity and Grip Strength in Forward Head Posture	Journal of Korean academy of orthopaedic manual therapy
2018	The Effect of Balance Exercise and Foot Orthotics on Forward Head Posture	Archives of Orthopedic and Sports Physical Therapy
2018	The Effect of Corrective Exercise and TECAR therapy on neck alignments and pain in Forward Head Posture Patient	Journal of Digital Convergence
2018	Effects of Breathing Exercise Program on Posture of Old Females	Journal of Korean Leisure Science
2018	Effects of Overhead Squat Exercise on Postural Correction of Elementary School Students	The Korean Journal of Growth and Development
2018	Effects of Overhead Squat Exercise on Postural Correction of Elementary School Students	The Korean Journal of Growth and Development
2018	The Effect of Climbing Training on the Postural Alignment and Balance Ability	Journal of the Korea Academia-Industrial cooperation Society
2018	Effect of Rehabilitation Exercise on Forward Head Posture and Respiratory Function According to Surface Conditions	The Korea Journal of Sports Science
2018	The Estimation of Craniovertebral Angle using Wearable Sensor for Monitoring of Neck Posture in Real-Time	Journal of Biomedical Engineering Research
2018	Working Posture Analysis for Preventing Musculoskeletal Disorders using Kinect and AR Markers	Korean Journal of Computational Design and Engineering
2019	Effects of Muscle Relaxation Approach and Joint Movement Approach on Neck Movement and Comfort of Daily Living in Patients with Tension-type Headache of Forward Head Posture	Journal of Korean Medicine Rehabilitation
2019	he Effects of Mckenzie exercise on Cervical Posture and Neck Disability Index for Elderly Women	Korean Journal of Sports Science
2019	Effects of Cervical Stabilization Exercise Using Pressure Biofeedback on Neck Pain, Forward Head Posture and Acoustic Characteristics of Chronic Neck Pain Patients with Forward Head Posture	J Korean Soc Phys Med