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Interesting Articles for KEMA Members

Shoulder injuries in athletes

The effects of an exercise intervention on forward head and rounded shoulder postures in elite swimmers

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ABSTRACT

Objectives To examine the connection of posture, increase in strength and decrease in shoulder pain and dysfunction in varsity swimmers.

Design and Setting Randomised clinical trial.

Participants Twenty-eight National Collegiate Athletic Association division I varsity swimmers.

Measurements Two testing sessions were conducted before and after an 8-week time period. Posture, strength and shoulder pain and function were assessed. Forward head angle was measured using a digital inclinometer, forward head translation was measured using a ruler and total scapular distance measured using a tape measure. Average and peak values (N) of strength were measured with the hand-held dynamometer. The intervention subjects then participated in an 8-week exercise training programme to correct posture. The procedures were then repeated in the post-test.

Results Significant group by time interactions ($p<0.05$) were found in forward head angle and forward shoulder translation indicating a decrease in forward head angle and forward shoulder translation. Significant main effects for time ($p<0.05$) were found in strength measures for all muscle groups indicating increased strength for shoulder girdle muscles tested.

Conclusions The exercise intervention was successful at decreasing forward head and rounded shoulder postures in elite swimmers. This study supports the theoretical basis for clinical rehabilitation of posture and the shoulder.

Competitive swimmers practise 6–7 days a week and swim on average 12 000 m each day, rotating the shoulder an estimated 16 000 times.[1] It is not surprising that competitive swimmers are plagued by varied levels of shoulder pain, which may or may not limit their regular activity.[2] One study has shown that 47% of collegiate swimmers claim to experience shoulder pain persisting for 3 weeks or more, causing eventual alteration or cessation of their normal swimming routines.[3] This shoulder pain, termed 'swimmer's shoulder', encompasses several pathologies including rotator cuff tendinitis, shoulder instability and shoulder impingement.[4] Swimmer's shoulder may be the result of several factors such as postural malalignments, altered scapular kinematics and muscular imbalances surrounding the shoulder and scapula.[4] As a result of the high frequency of shoulder pain in swimmers, it is important to understand the factors that may contribute to the development of swimmer's shoulder and to develop effective methods to prevent and to rehabilitate the injury.

Head and shoulder postural malalignments are thought to influence the muscular balances surrounding the shoulder. Forward head posture (FHP) is a forward inclination of the head with cervical spine hyperextension and is associated with shortening of the upper trapezius, the splenius and semispinalis capitis and cervicis, the cervical erector spinae and the levator scapulae musculature.[5] This posture may change the position of the scapula and decrease the ability of the scapula to rotate upwardly,[5] a common characteristic found in patients with shoulder impingement.[6] Research has shown FHP to be significantly greater in individuals with shoulder pain when compared with a healthy population.[7] Rounded shoulder posture (RSP) is a forward deviation of the scapula as caused by a muscular imbalance between a shortened pectoralis minor and a lengthened middle trapezius.[5] RSP also places the lower trapezius and serratus anterior positions, which are thought to influence scapular tilt negatively.[5 8–10] This may be important as increased anterior scapular tilt and scapular internal rotation are associated with shoulder impingement.[11 12] These altered scapular mechanics are related to shorter pectoralis minor length[13] and decreased serratus anterior and lower trapezius activity.[11 14]

Exercise interventions aimed as strengthening weak musculature and stretching tight, overdeveloped musculature is thought to improve FHP and RSP.[15 16] Strengthening of the scapular stabilisers and stretching of the anterior musculature, namely the pectoralis minor, is thought to be the method to treat RSP.[17] Treatments of FHP most often centres on stretching the shortened upper trapezius and levator scapula. Few studies have attempted to correct posture through a training protocol involving flexibility and strength exercises.[17 18] These studies suggest that FHP and RSP can improve but have not examined whether changes occur in shoulder girdle muscle performance or clinical outcomes. The purpose of this study was to evaluate the effects of 8 weeks of exercise training on FHP and RSP, shoulder girdle strength and clinical outcomes in division I collegiate swimmers. We hypothesised that measures of FHP and RSP, strength and shoulder pain and function would improve following the intervention.

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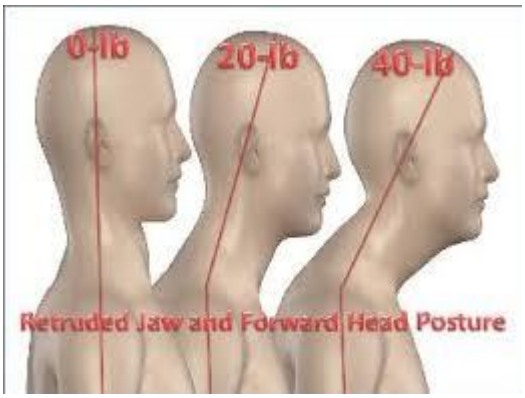
거북목, 굽은어깨

감소시키는 효율적 운동 방법은 무엇이 있을까?

The effects of an exercise intervention on forward head and rounded shoulder postures in elite swimmers

Br J Sports Med. 2010 Apr;44(5):376-81.

거북 목과 굽은 어깨
(Forward head posture & Rounded shoulder postrure)



머리와 어깨의 자세 비정상적 정렬은 어깨를 둘러싼 근육의 밸런스에 영향을 미친다.

거북목 자세(FHP)는 어깨 통증과 연관되고 이것은 목 뼈가 과도하게 폄이 일어난 것이며, 위등세모근(upper trapezius), 어깨 올림근(levator scapulae)등 여러 목 근육의 짧아짐과 연관된다.

굽은어깨(RSP)는 어깨뼈가 과도하게 앞으로 벌어진 경우를 말하는데 이는 작은가슴근(pectoralis minor)가 짧아지고 중간등세모근(middle trapezius)가 과도하게 늘어난 형태와 연관된다.

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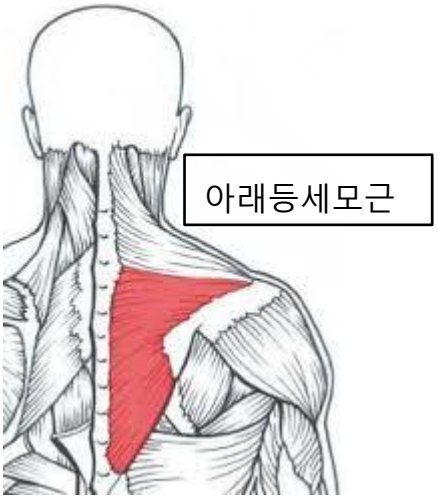
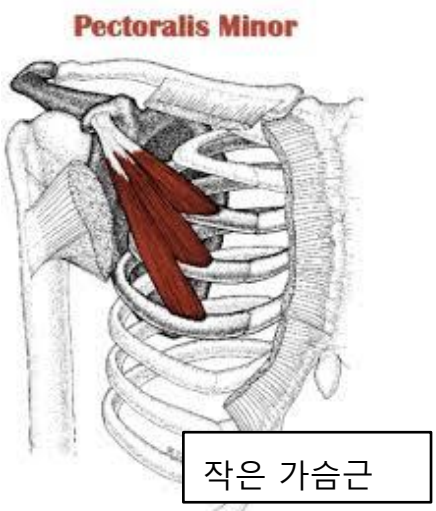
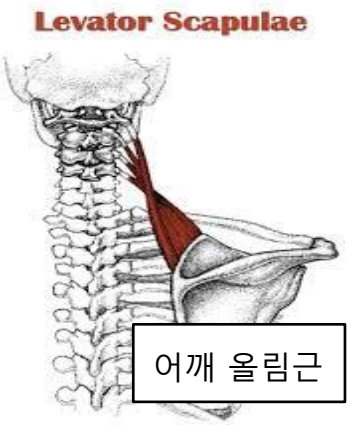
거북목 & 굽은어깨 치료 접근 방향

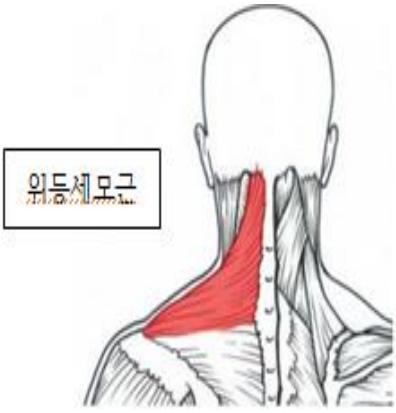




Rouneded shoulder posuture

1. 작은 가슴근 (Pectoralis minor) 스트레칭
2. 앞톱니근(Seratus anterior) 강화
3. 아래등세모근(Lower trapezius) 강화





Forward head posture

1. 어깨올림근(Levator scapulae) 스트레칭
2. 아래등세모근(Lower trapezius) 강화

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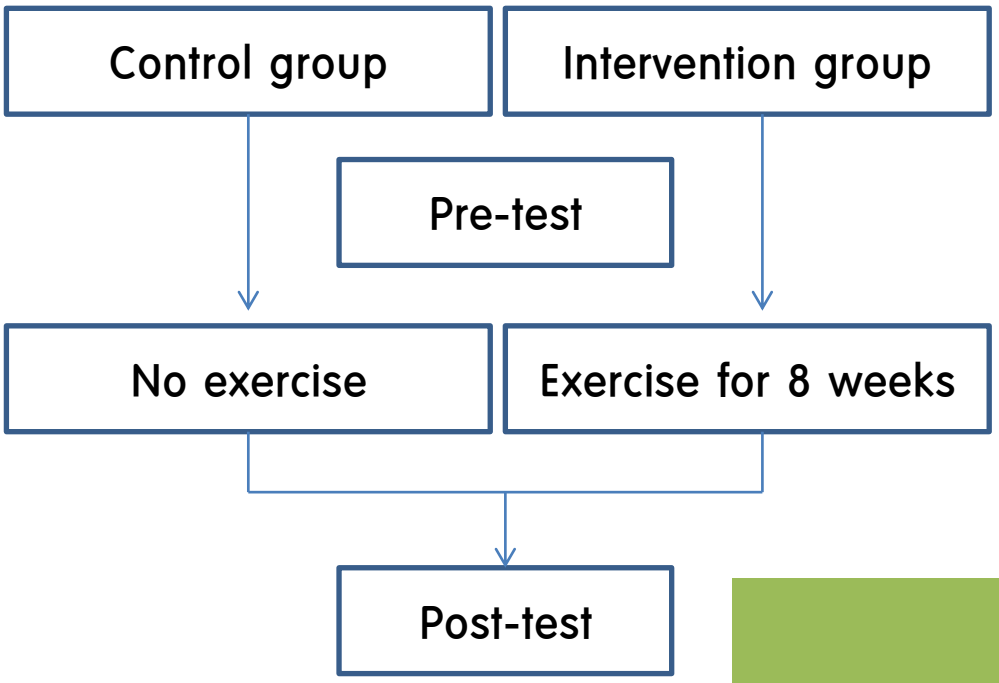
거북 목 자세와 굽은 어깨 자세를 가진 수영선수 대조군(14명)과 운동그룹(14명)을 비교하였다.



방법

1. 자세정렬, 근육의 힘, 어깨 통증과 기능이 pre-test와 post-test에서 측정되었다.
2. 운동그룹(Intervention group)만 8주동안의 운동이 적용 되었다.
3. 운동 그룹에서는 다음 동작들이 10회씩 3세트로, 일주일에 3번 적용 되었다.

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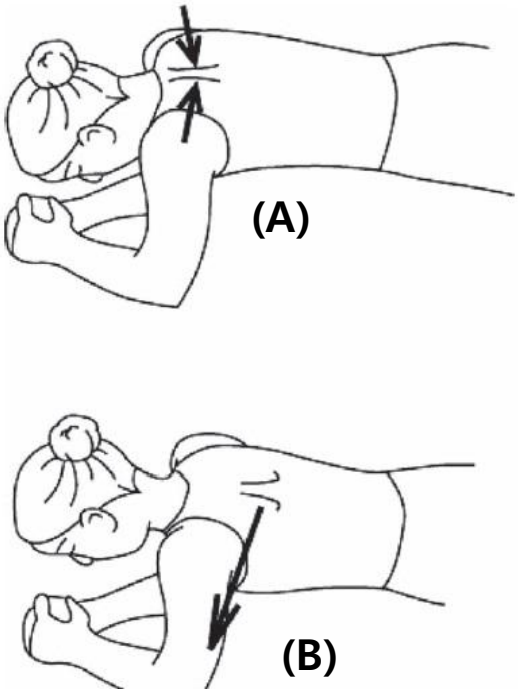
Serratus anterior strengthening

-정의 : 앞톱니근을 발달시키기 위한 운동이다.

- 방법 : 아래팔과 발끝으로 엎드려서 바닥에 무게를 지지하고(A) PUSH UP을 1-2cm 정도 하여 어깨뼈를 앞쪽으로 내민다(B).



Pectoralis minor stretching

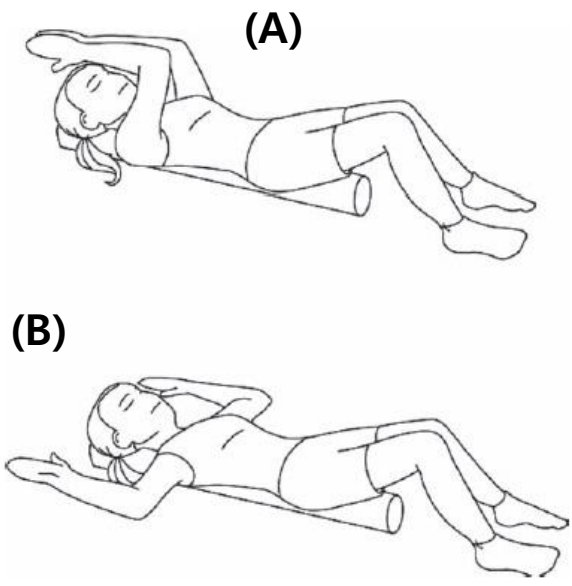


Figure 4 Pectoralis stretch on foam roll described in table 3.

-정의 : 작은 가슴근을 유연성을 위한 운동이다.

- 방법 : Roll 위에 누워 복근을 수축하여 허리를 평평하게 만든다. (A) 어깨뼈를 조이며 팔을 양옆으로 벌린다.(B) 5초씩 10번 반복한다.

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Scapular muscles strengthening exercise

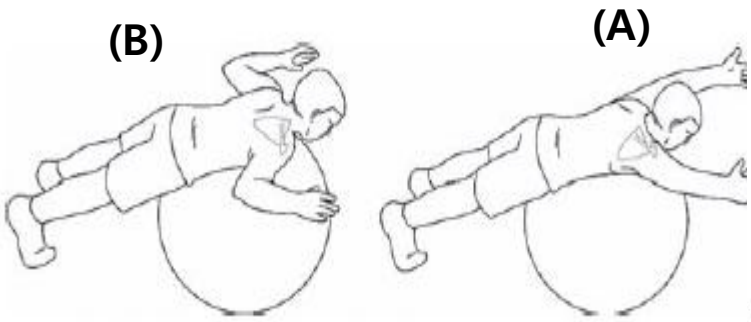

Figure 1 Y to Ws described in table 2.

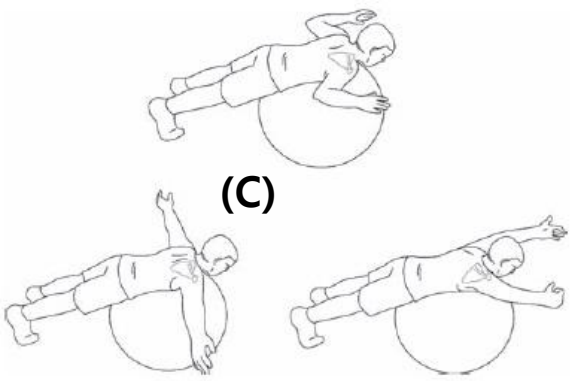

Figure 2 L to Ws described in table 2.

-정의 : 아래등세모근과 가운데등세모근을 발달 시키기 위한 운동이다.

- 방법 : 볼에 기대어 몸을 편 후, 120°정도 팔 굽힘을 한 후 4-5인치 정도 팔을 들어 유지한다.(A) 그리고 팔을 펴서 W자 모양을 만든다. 팔과 팔꿈치를 90° 을 유지(L자) 하고(B) 다시 W자 모양으로 돌아온다.(C)

Chin tucked exercise

-정의 : 목의 안정화 근육 강화와 자세운동

- 방법 : 턱을 테이블 쪽(뒤쪽)으로 당긴다. 목의 굽힘을 이용하여 턱이 가슴이 닿지 않도록 한다.

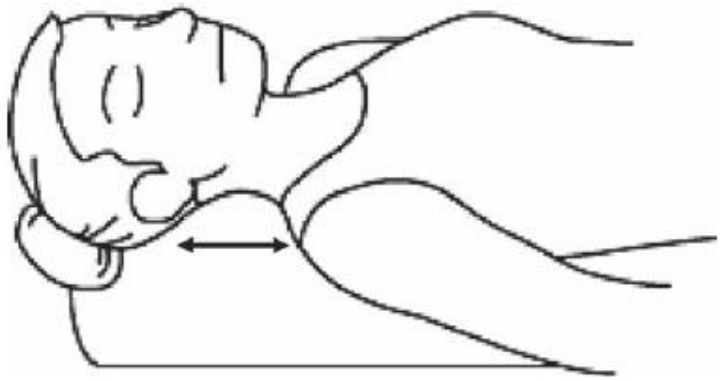

Figure 5 Chin tucks described in table 3.

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대조군과 운동군의 중간등세모근, 아래등세모근, 위톱니근에서의 힘의 차이 값

Table 5 Means and SD of average and peak strength values for control and intervention subjects, pretest and post-test

Strength measures	Control				Exercise group			
	Pretest		Post-test		Pretest		Post-test	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Middle trapezius (N)								
Average	49.43	20.65	56.14*	25.68	48.05	17.38	55.14*	17.67
Peak	51.76	21.89	58.19*	27.51	49.52	18.45	57.71*	19.18
Lower trapezius (N)								
Average	48.38	19.22	57.29*	27.66	45.10	16.95	58.52*	19.04
Peak	50.81	20.88	59.95*	30.27	46.76	18.51	61.29*	20.83
Serratus anterior (N)								
Average	174.29	80.19	216.81*	95.22	169.29	67.73	216.48*	46.65
Peak	189.00	91.28	234.62*	108.80	182.90	79.03	234.76*	60.97

*Denotes a significant main effect for time ($p<0.05$).

결과

→ 두 그룹 모두에서 각 근육그룹의 힘이 증가 되었음을 알 수 있다.

→ 대상자가 수영선수이고, 두 그룹 모두 강도 높은 운동을 하고 있었기 때문에 두 그룹간 Pre-test, Post-test차이가 유의하지 않았을 수 있다.

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대조군과 운동군의 목의 각도와 어깨 앞쪽 이동의 차이 값.

Table 4 Means and SD for FHA, FST and TSD in control and intervention subjects, pretest and post-test

Postural measures	Control				Intervention group			
	Pretest		Post-test		Pretest		Post-test	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
FHA (°)	10.23	3.54	9.14	3.50	11.29	4.71	7.12*	4.17
FST (cm)	9.07	1.7	9.45	1.43	9.62	1.82	8.39*	1.82
TSD	1.71	0.12	1.75	0.13	1.69	0.10	1.72	0.11

*Denotes a significant interaction ($p<0.05$).
FHA, forward head angle; FST, forward shoulder translation; TSD, total scapular distance.

결과

→ 운동 그룹에서만 목의 각도와 어깨 앞쪽 이동이 유의하게 감소함을 알 수 있었다.

→ 대조군에서 14명중 9명이 통증이 증가 되었다고 했지만, 운동 그룹에서는 14명중 11명에서 통증이 감소 됐거나 그대로 라고 했다.

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거북 목과 둥근 어깨 자세를 관리 하기 위한 여러 가지 방법들이 알려져 있지만, 이와 같은 운동법을 적용하면 목의 각도와 굽은어깨 자세를 감소 시키는데 효과 적일 수 있고, 어깨 통증을 감소하고 자세를 증진시키는데 효율성을 높여 줄 수 있다.

어깨를 관리하는 방법은 다양하다.

효율적인 운동법을 적용 한다면,

전반적으로 목, 어깨 자세와 통증을 효율적으로 감소하는데

도움이 될 것이다.

라고 이 논문을 근거로 이야기 할 수 있을 것이다.

-KEMA 책임 연구원 김현아-

-문의사항은 KEMA 홈페이지 기사에 댓글로 남겨주세요-

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