

Interesting Articles for KEMA Members

Reliability of Thoracic Spine Rotation Range-of-Motion Measurements in Healthy Adults

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Context: The reliability of clinical techniques to quantify thoracic spine motion range of motion (ROM) has not been established.

Objective: To determine the intratester and intertester reliability of 5 clinical rotation measurement techniques.

Design: Descriptive laboratory study.

Setting: University research laboratory.

Patients or Other Participants: Forty-one healthy college students.

Measures and Main Results: We tested 5 thoracic spine ROM techniques over 2 days: seated rotation test in back and front, functional rotation test in back and front, and left and right rotation test in back and front. On day 1, 2 techniques showed 2 sets of measurements (seated 1, 2) to decrease the within-subject measurement reliability (intratester reliability) on day 2 (seated 1) to increase the intertester reliability between days. Each technique showed 2 sets of measurements, and day 2 was used for data analysis. Reliability was determined using intraclass correlation coefficients, standard error of measurement (SEM), and minimal detectable change (MDC). Differences between techniques during session 1 were determined using paired t tests.

Conclusion: Intratester reliability was good for all techniques. Intertester reliability was fair to good for all techniques. The seated rotation test in back and front, functional rotation test in back and front, and left and right rotation test in back and front may be used with confidence by clinicians and researchers.

Key Words: Thoracic spine, reliability, measurement, motion, range of motion.

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“Thoracic rotation
어떻게 측정하세요?”

Reliability of thoracic spine rotation range-of-motion measurements in healthy adults.

J Athl Train. 2012;47(1):52-60.

흉부(thoracic region)의 정상적인 돌림 은

골프, 조정(Rowing), 야구, 체조와 같이 흉추의 돌림 (thoracic rotation)이

많이 요구 되어지는 스포츠 활동에서

선수들에게 Performance의 향상을 위한 중요한 요소라고 볼 수 있다.

따라서, 이러한 선수들의 performance 향상과 injury 예방을 위해

Thoracic rotation 의 정확한 측정은 필수적인 요소라고 볼 수 있다.



흉추의 돌림을 측정하는 방법으로 무엇이 가장 좋을까?

흉추의 돌림 각도를 측정하기 위해서 지금까지 다양한 방법이 제시되어왔다.

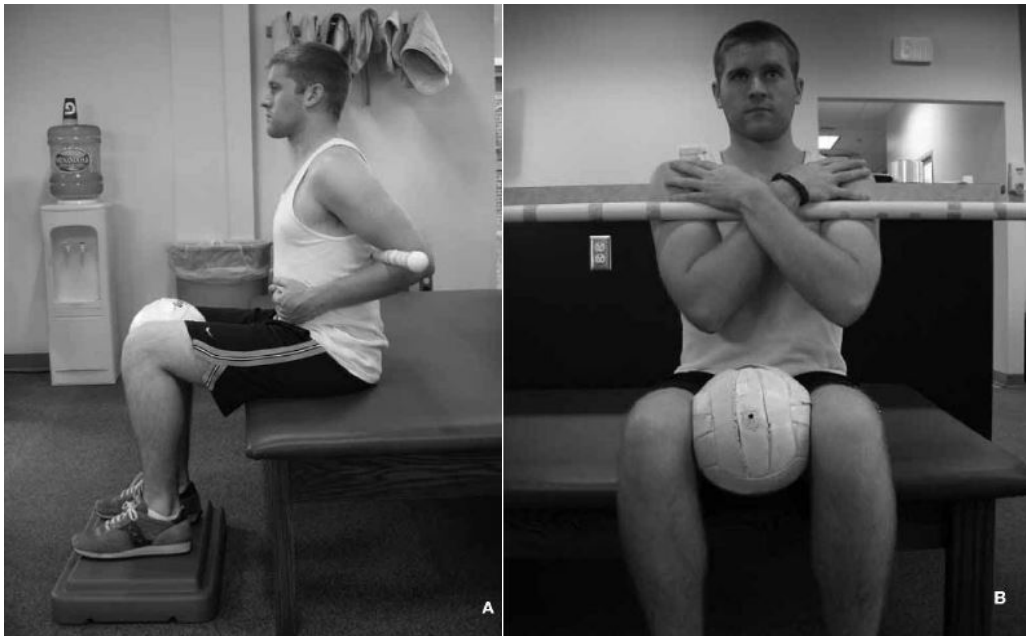
그 중 가장 정확한 측정 방법으로 영상진단(diagnostic imaging)과 같은 방법

이 제시 되었다. 하지만 이러한 방법은 비용적인 면에서 그리고 환자의 건강을
생각하여 임상적으로 자주 쓰여지기가 어려웠다.

그렇다면, 어떤 방법이 흉추의 돌림 각도 측정으로 가장 좋을까?

-이 논문에서 측정 방법으로 크게 5가지를 제시하고 있다.

- 1) Seated Rotation Test with Bar-in-back position / Bar-in-front position
- 2) Half-Kneeling Rotation Test with Bar-in-back position / Bar-in-front position
- 3) Lumbar-Locked Rotation Test



- 1) Seated Rotation Test with Bar-in-back position (그림 A) / Bar-in-front position (그림 B)

위에서 보이는 그림은 hip과 knee joint를 90도로 구부린 후 양 무릎 사이에 공을 위치시킨다. 그림 A에서는 바(bar)를 그림과 같이 등 뒤에 위치시키고 양 손은 복부 위에 위치시킨다. 그림 B에서는 바를 그림과 같이 흉부 앞에 위치시키고, 양 팔은 팔짱을 낀다.



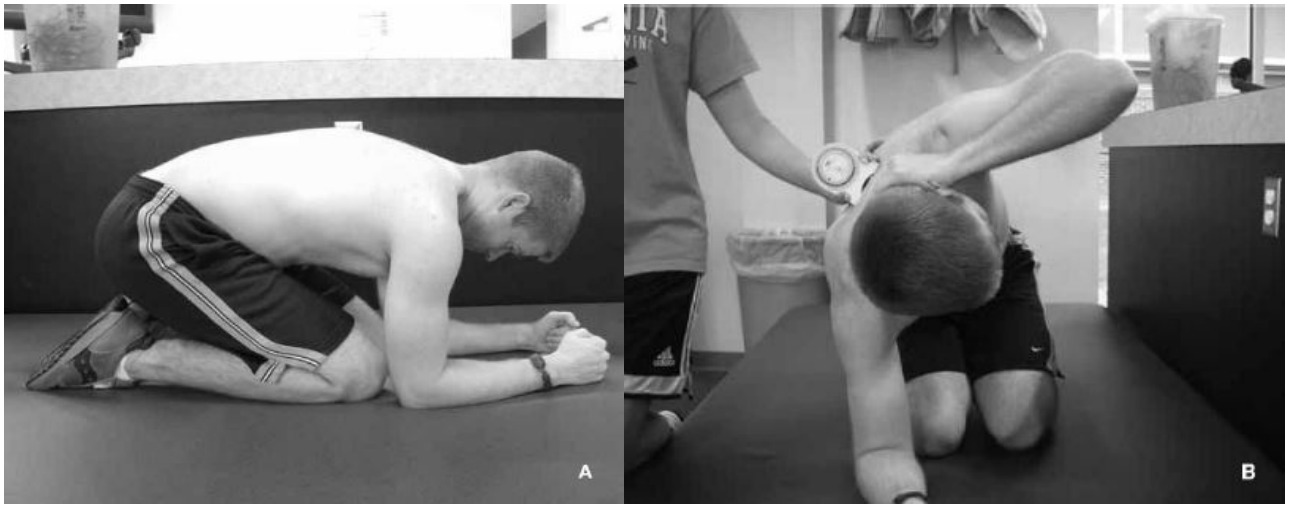
-옆에 보이는 그림은 hip과 knee joint를 90도로 구부린 후 앞으로 나가는 발을 knee joint 와 같은 선상에 위치시킨다. 그림 A 는 왼쪽 돌림을 시행할 때의 시작 자세이다. 돌리고자 하는 방향에 있는 다리를 앞으로 내밀어 시행한다. 그림 B 는 앞으로 나가 있는 다리 쪽으로 상체를 돌렸을 때의 자세이다. 앞서 설명한 Seated Rotation Test 와 같이 바를 몸의 앞 / 뒤에 위치시켜 측정한다.

2) Half-Kneeling Rotation Test with Bar-in-back position (그림 A) / Bar-in-front position (그림 B)

그렇다면, 이러한 test 자세에서 무엇을 이용하여 측정할까?



일반적으로 손쉽게 구할 수 있는 goniometer 를 사용한다. Goniometer 는 spine of scapula 를 기준으로 하여 T1~T2의 위치에 지면과 평행하게 배치한다. 그림을 기준으로 오른쪽 돌림이 일어날 때 stationary arm 은 돌아가는 쪽으로 부터 떨어져 처음 시작 자세에 평행하게 유지한다. Mobile arm 은 흉추의 돌림을 따라 위치하여 기준점이었던 spine of scapula 에 평행하게 유지한다.



3) Lumbar-Locked Rotation Test

– 위에 보이는 측정은 일반적인 **quadruped position** 에서 시작한다. 그림 A 는 shoulder 와 elbow joint 를 90도 각도로 구부리고, 엉덩이가 최대한 발꿈치에 닿도록 한다. 그림 B 는 왼쪽 돌림을 시행할 때 왼쪽으로 돌아감에 따라 목도 neutral position 이 되도록 하는 동안, 오른쪽 forearm 은 지면에 밀착시킨 채로 유지한다.

– 이 때 사용되는 **bubble inclinometer** 는 **spine of scapula** 를 기준으로 하여 **T1~T2의 위치에 지면과 수직**이 되도록 배치하여, 한 쪽 방향으로 돌렸을 때의 **end range 에서의 각도**를 측정한다.

주의사항

- **Seated Rotation Test** : 앉은 자세에서 대상자가 흉부의 돌림이 일어날 때 양 쪽 무릎 사이의 공과 발 사이 간격이 잘 유지되어야 한다.
- **Half-Kneeling Rotation Test** : Half-Kneeling 자세에서 흉부의 돌림이 일어날 때 knee 와 feet 이 일직선에 있는지 또는 머리와 목의 돌림이 일어나지 않게 유지 되는지 확인한다.
- **Lumbar-Locked Rotation Test** : 엉덩이가 발꿈치에 닿을 정도로 뒤로 갈 수 있는지 확인하고, 흉부의 돌림이 일어날 때 한 쪽 forearm 이 지면에 밀착되어 90도 각도를 잘 유지하는지, 반대쪽 손이 목 뒤에 위치하여 잘 유지하는지 확인한다.

이 논문에서 제시하는 5가지 측정 방법은 **같은 측정자**에게서
모두 **높은 신뢰도**를 가지고 있다고 보고 있다.

하지만, 동일한 대상자에게 **서로 다른 측정자**가 측정할 경우

Seated rotation test with bar in front position /

Lumbar locked rotation test

에서 가장 신뢰할 만한 측정 결과를 가지고 있다고 말하고 있다.

따라서 이러한 결과에 따라,

임상적으로 여러 명의 측정자가 같은 대상자를 측정할 경우,

좀 더 **신뢰할 수 있는 측정 결과**를 얻기 위해서

앞에 제시한 두 가지 방법이 가장 좋다고 볼 수 있을 것이다.

-KEMA 책임 연구원 전인철-

-문의사항은 KEMA 홈페이지 기사에 댓글로 남겨주세요-