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The Investigation to Clarify the Most Effective Rotatory Range of Cuff Exercise for Making the Better Function of Rotator Cuff

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Faculty Disclosure Information

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- **I have no financial relationships to disclosure.**

My hometown,

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【Background】

In order to prevent shoulder problems, such as instability and impingement,

- **it is essential to make an appropriate joint congruity.**

*** *Force couple mechanism***

is the most important function of rotator cuff, *especially SSC and ISP*.

- ***Cuff exercise (CE)* plays an important role in generating**

force couple mechanism.

【Purpose】

Basically,

- the CE is an internal and external rotational movement at the side using contraction of SSC and ISP.

However,

- there is no recommended way to make force couple mechanism better.

For example, in the CE

- ✓ What position is good?
- ✓ What range of rotation is good?
- ✓ How many times and how often?

➢ *In this study, we certify the better range of rotation in the CE.*

【Subjects & Method】

10 healthy cases, 20 shoulders with no shoulder problems

✓ average age: 26.6 yrs. (22～36 yrs.)　✓ All male and right-handed

● *According to rotational range of motion,*
the CE was divided into the following two exercises.

➢ Inside CE: Subjects performed rotational motion only within the neutral rotational position at the side.

➢ Outside CE: Subjects performed it only outside the neutral position at the side.

Neutral rotational position

◆ At first,
both shoulders of each subject performed either the Inside CE or the Outside CE.

◆ At second,
after sufficient interval, at least one week later, they performed the other.

【Method】

The left shows the Inside CE, and the right shows the Outside CE.

Inside CE

Outside CE

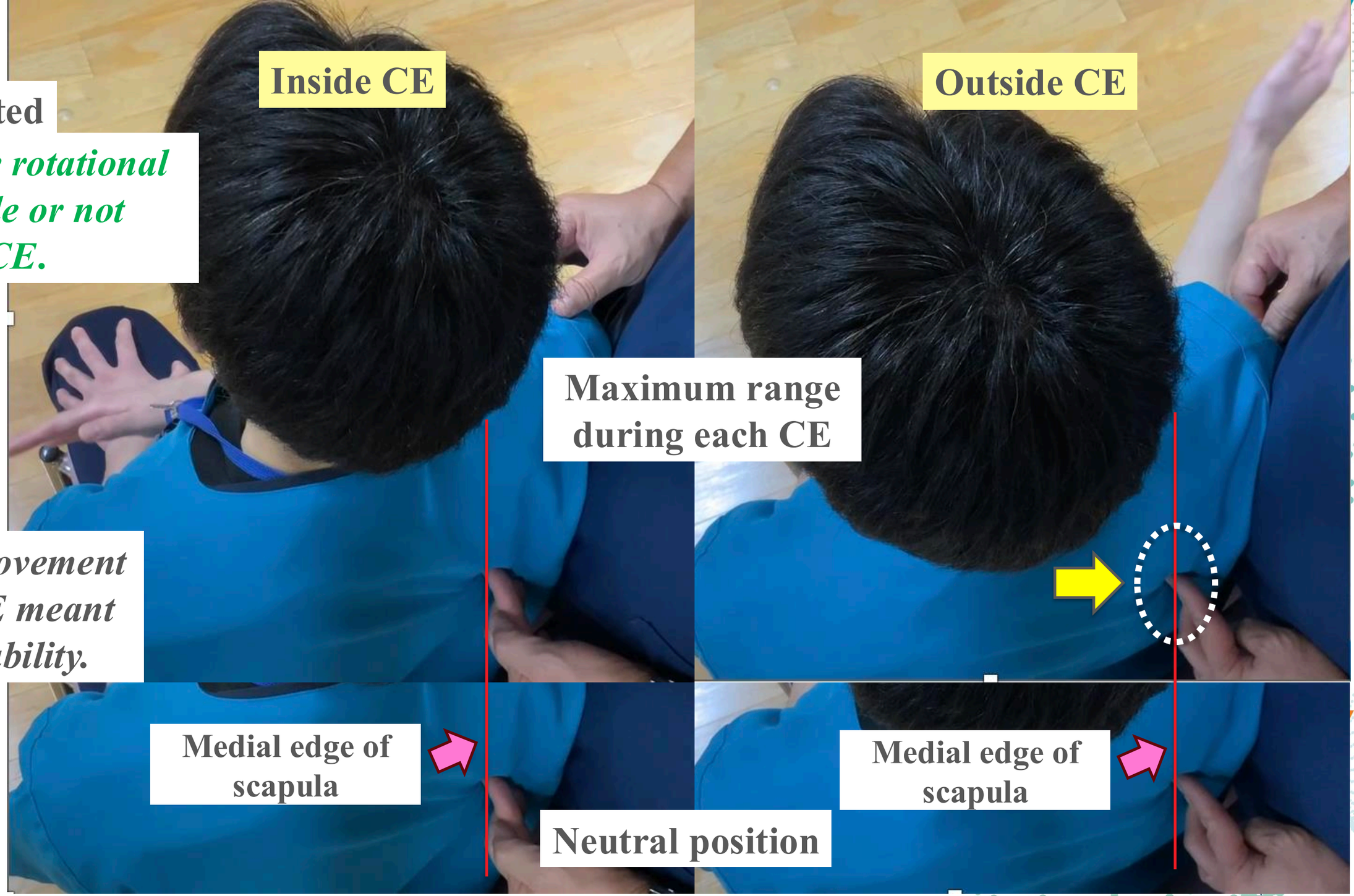
☐ **Each subject performed 30 unloaded rotational movements during each inside and outside CE.**

【Method】

- We evaluated

➢*whether the rotational axis was stable or not during each CE.*

➢*Scapular movement during the CE meant scapular instability.*



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【Method】

We measured

- ERA: external rotation angle at the side and
- ERS: external rotation strength by ISP,
  (using digital handheld dynamometer)

1. before CE
2. after CE, respectively.

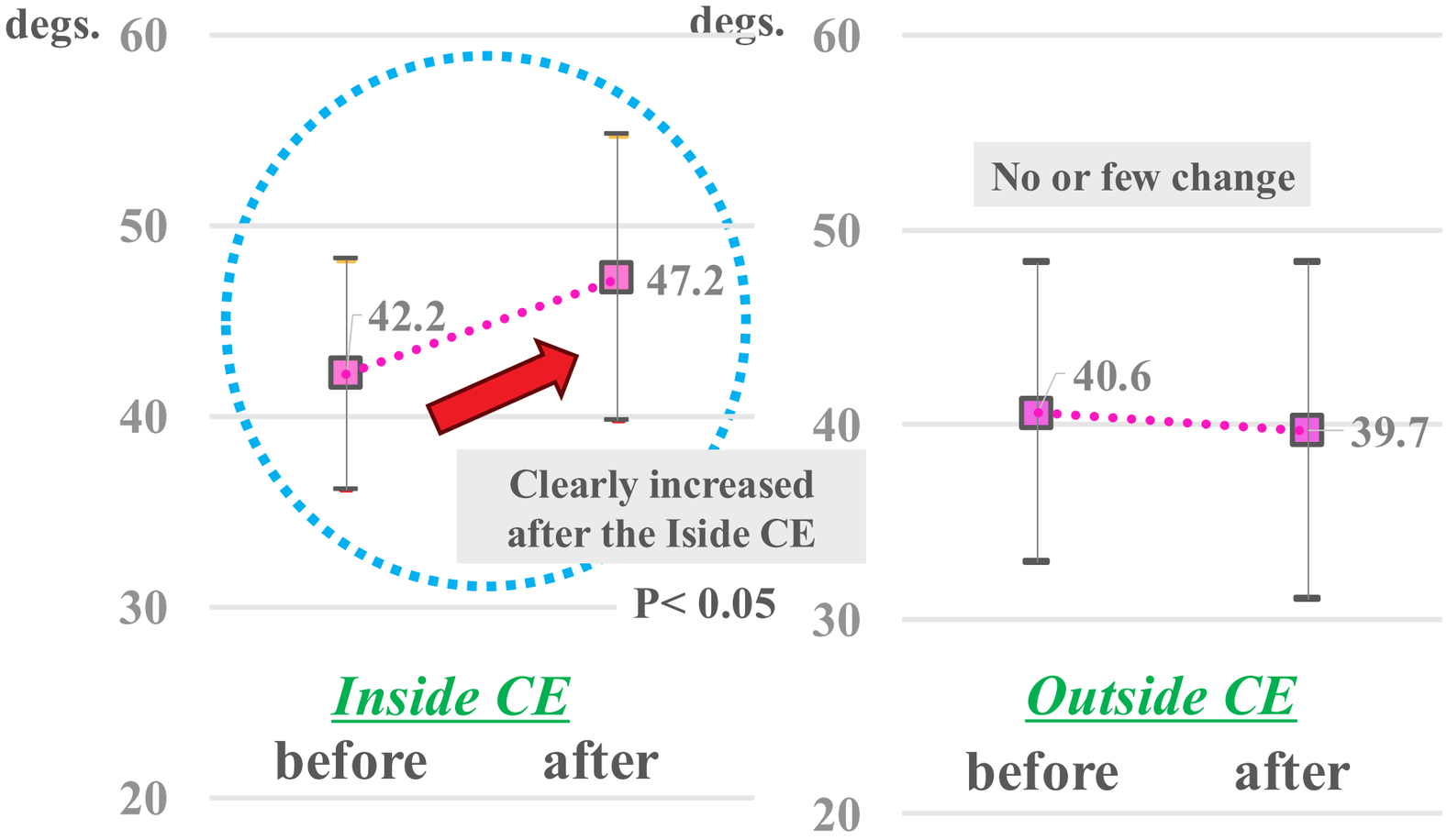
- **ERS was measured three times, whose average was corrected for body weight.**

- *Statistical analysis: paired t test*

- **We statistically compared both ERA and ERS before and after each Inside and Outside CE.**

*Statistically significant level was 0.05.

➢ Result: the difference of ERA between before and after each Inside and Outside CE



- **The ERA after Inside CE was clearly increased, compared with that after Outside CE with statistical significance (P=0.05).**

➢ Result: the difference of ERS between before and after each Inside and Outside CE

	Inside CE	Outside CE
ERS before CE	1.26±0.39N/kg	1.04±0.17N/kg
ERS after CE	1.34±0.41N/kg	1.32±0.24N/kg

➢ *There was little change between the ERS before and after each CE.*

➢ Result: Scapular movement during each CE

◆ *Rotational axis in the CE was*

- 14 of all shoulders (87.5%) showed scapular movement was *observed during the Outside CE,* ➡ ✓ *unstable*

while

- it was *not observed during the Inside CE.* ➡ ✓ *stable*

***This scapular movement during the Outside CE might cause the contraction of ISP insufficient due to unstable rotational axis in the CE.**

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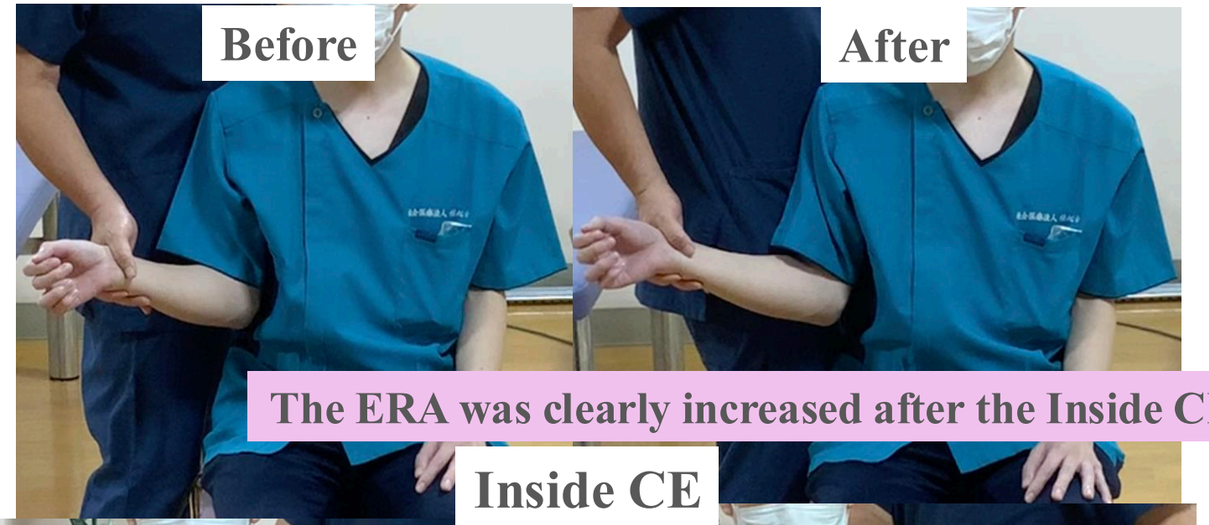
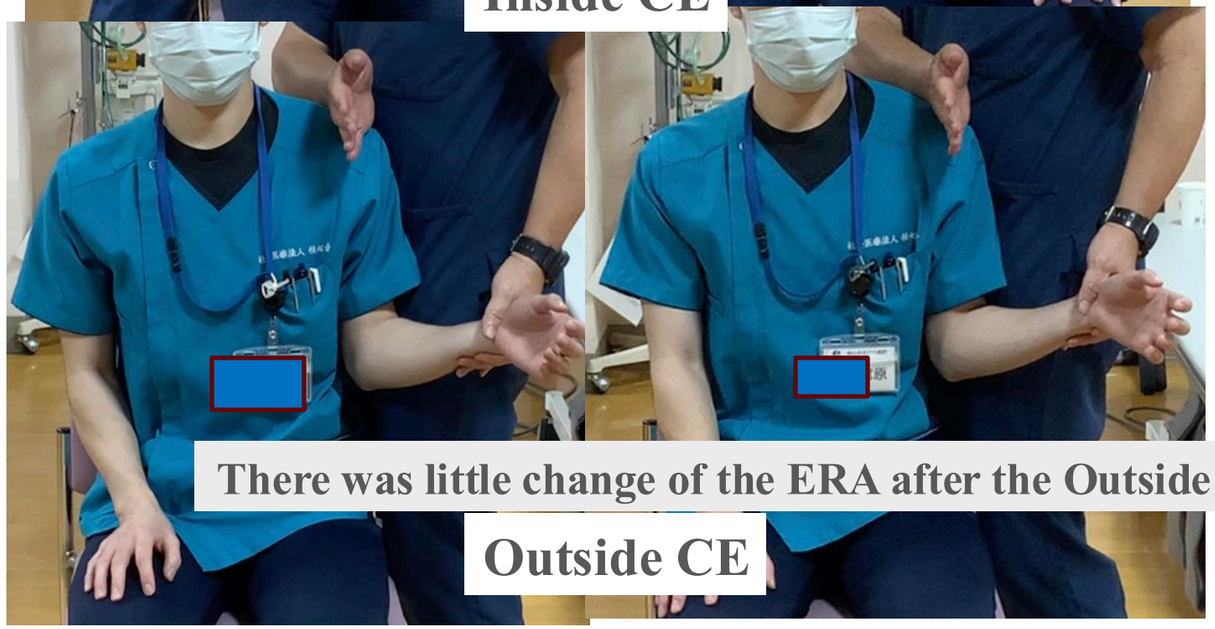
Case: change of ERA after inside CE and outside CE



The ERA was clearly increased after the Inside CE.

Inside CE



There was little change of the ERA after the Outside CE.

Outside CE

【Discussion】

Our result showed

1. **the ERA was clearly increased after the Inside CE,**

while

2. **There was no or little increase of that after the Outside CE,**

which meant the Inside CE was more effective than the other to make a good ER through the CE.

- ***Scapular movement during the CE was only observed in the outside CE (87.5%).***
  - **We think this scapular movement meant the rotational axis was unstable.**

■ ***The unstable rotational axis caused insufficient contraction of ISP in the CE,***

◆ ***which made the improvement of ERA in the Outside CE lower, compared with that in the Inside CE.***

【Conclusion】

- As for the optimal rotational range in the CE,

***our results showed the inside CE was superior to the outside CE because of significant improvement of ERA after the former.**

Thank you for your attention!!