

# Long-term clinical outcomes and imaging evaluation more than 10 years after arthroscopic rotator cuff repair

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# COI Disclosure Information

Presenter: Hironori Kakoi

I have no financial relationships to disclose.



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## 【Background】

The number of arthroscopic rotator cuff repair (ARCR) is consistently increasing.

Many reports have evaluated the short and medium term clinical outcomes.

However, few reports have evaluated the long term clinical outcomes and imaging findings.

## 【Purpose】

To evaluate the long term clinical outcomes and the state of the rotator cuff more than ten years after ARCR



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# 【Methods】

## Subjects

**23 shoulders (Follow up rate : 51.1%)**

All rotator cuff tears were repaired by single row or double row method using suture anchor

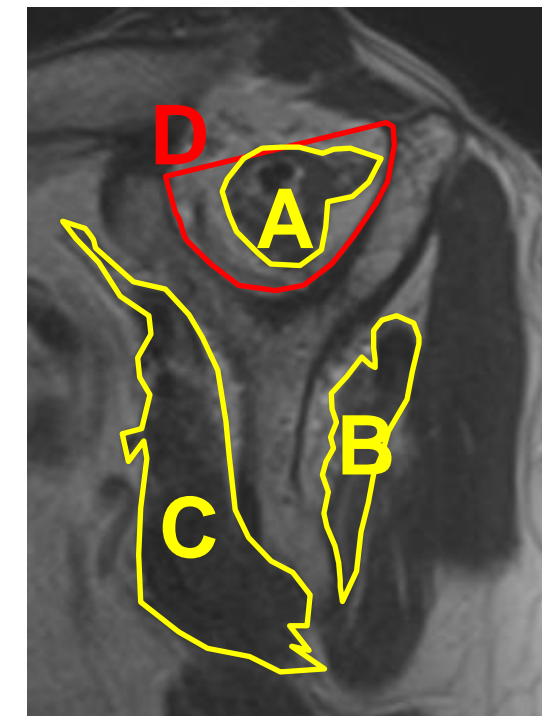
Age at the time of operation : mean 59.2 years (range 34~71)

Post-operative follow-up period : mean 126.7 months (range 120~138)

Tear size				Repair method	
Small	Medium	Large	Massive	Single row	Double-row
4	5	12	2	5	18

## Examination items

- Japanese Orthopedic Association score (JOA score)
- active flexural ROM
- re-tear rate ; MRI Sugaya classification : type IV or V
- Fatty infiltration of rotator cuff ; global fatty degeneration index (GFDI)
- Muscle atrophy ; percentage of cross-sectional area(PCSA)



$$PCSA(\%) = \frac{A + B + C}{D} \times 100$$

A : cross section of SSP

B : cross section of ISP

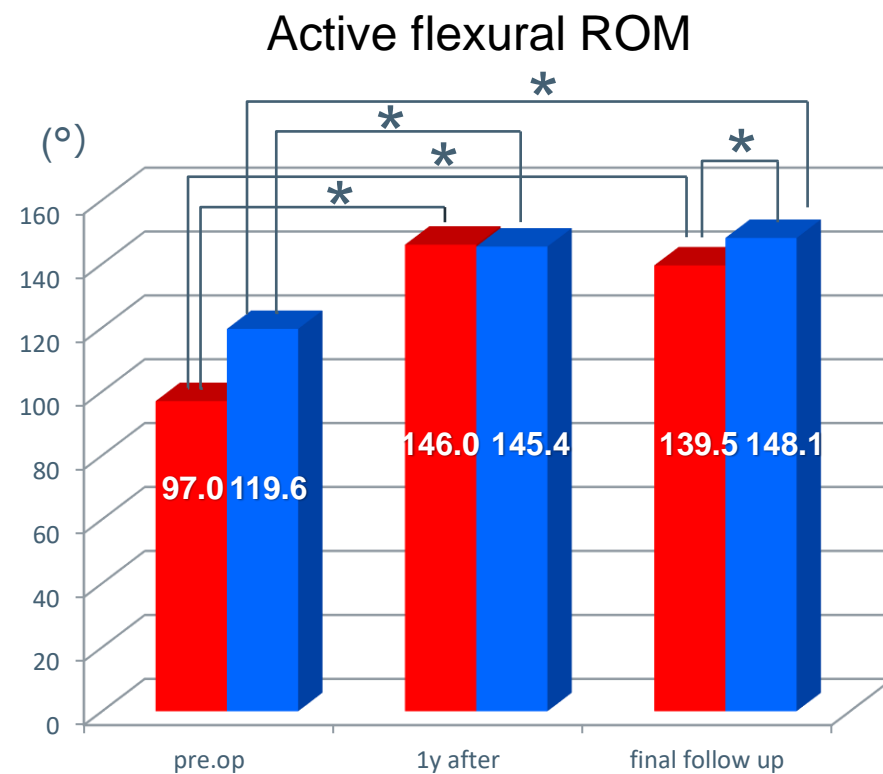
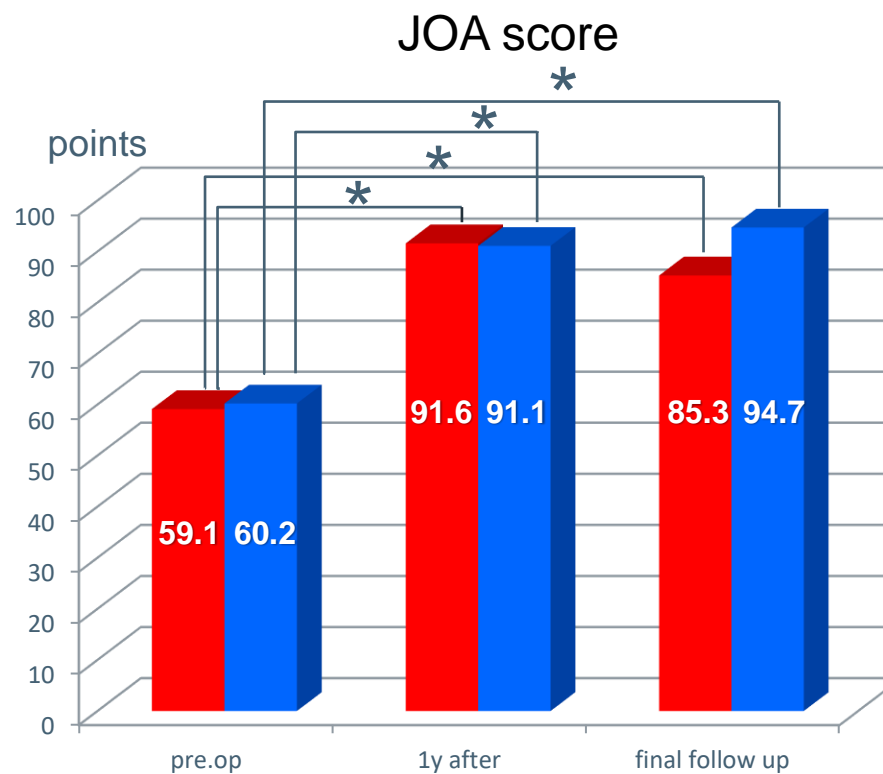
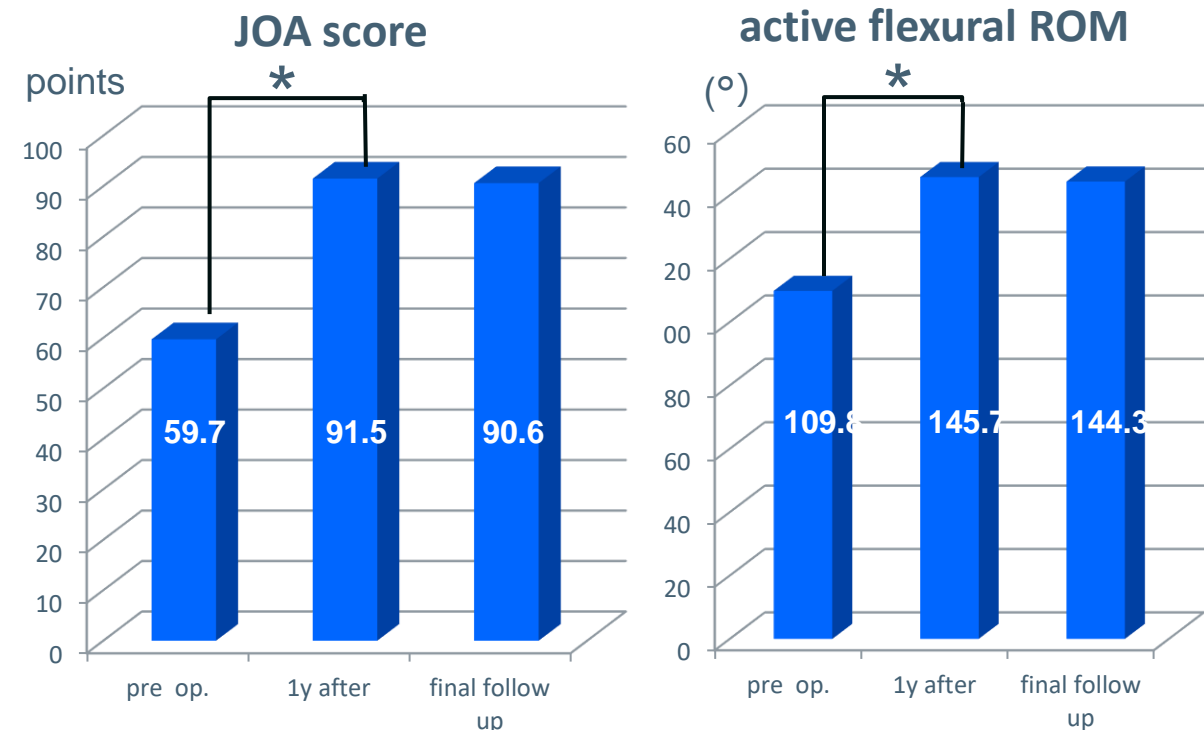
C : cross section of SSC

D : cross section of Supraspinatus fossa

# 【Results】

## Relevance of clinical results and re-tear

Re-tear	No	age	Follow-up (M)	size				Repair method	
				small	medium	large	massive	Single-row	Double-row
(+)	10	60.5	128.7	0	0	8	2	3	7
(-)	13	58.2	125.6	4	5	4	0	2	11
		N.S.	N.S.	P < 0.05				N.S.	



\* : P < 0.05

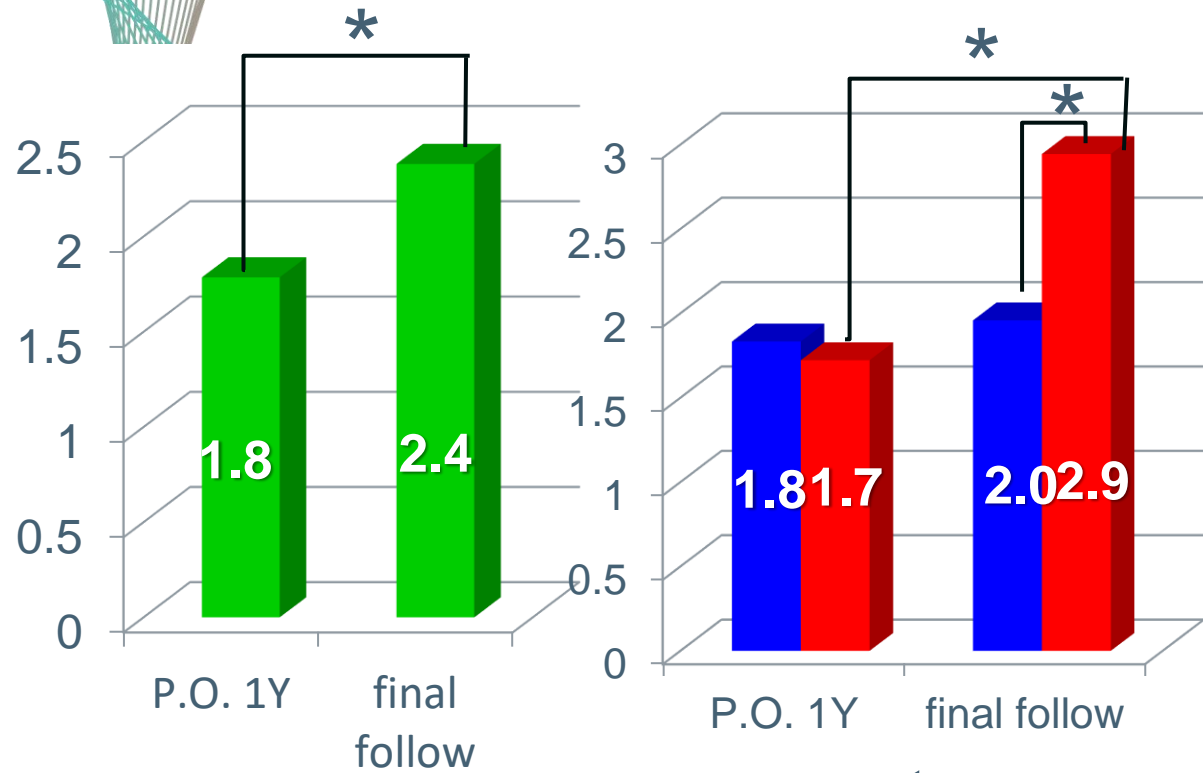
Re-tear rate : 43.5%  
(10/23 shoulders)

\* : P < 0.05

■ re-tear (+)

■ re-tear (-)

# 【GFDI】

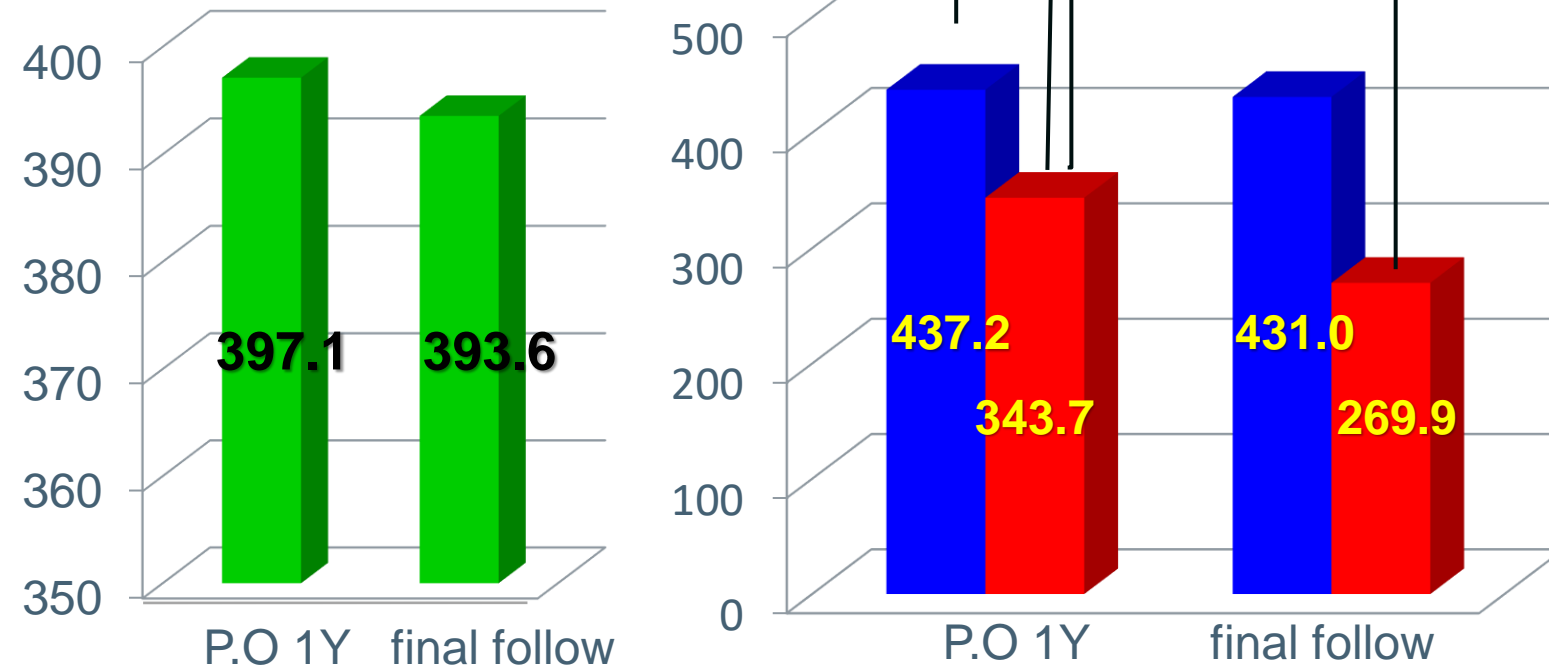


\* : P < 0.05

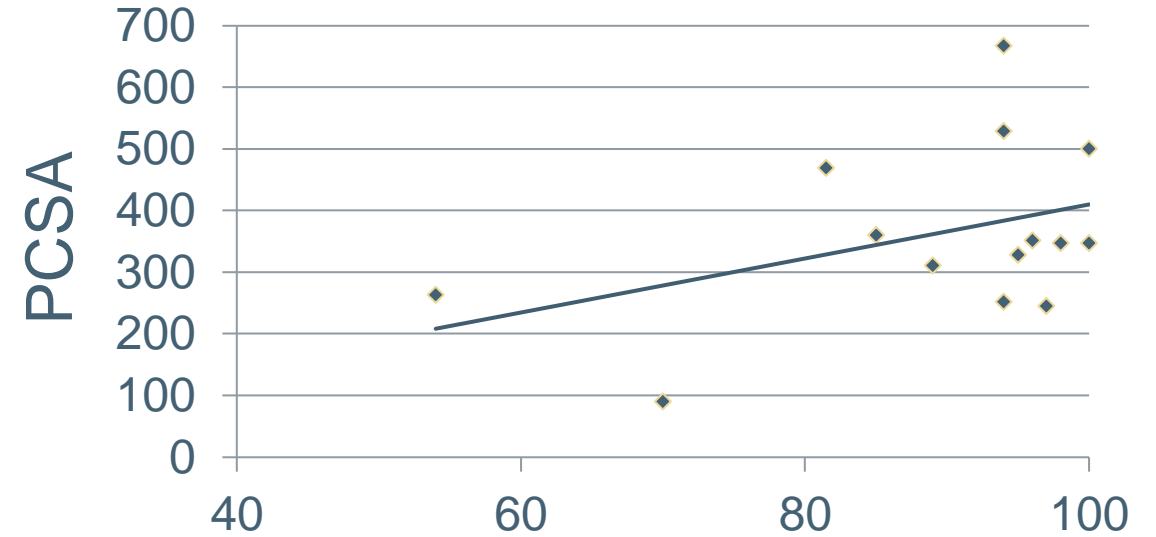
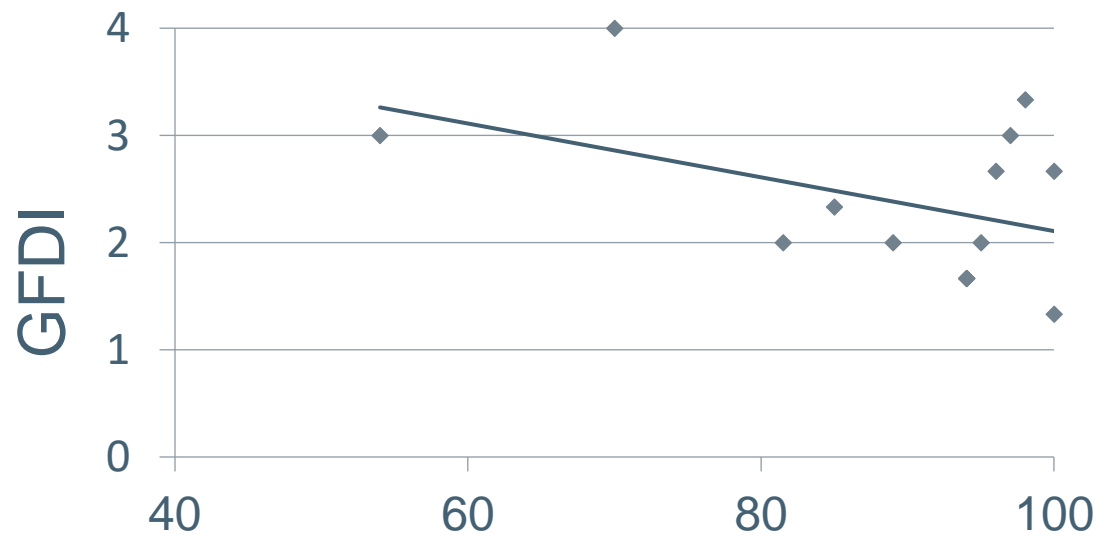
■ re-tear(-)

■ re-tear(+)

# 【PCSA】



## Relation between the clinical results and structural outcome





# 【Discussion】

## Long-term results of ARCR

Reference	Patients	Follow up, months	Clinical outcomes		
			preoperative	Short term	Final follow up
Dohke	116	150			JOA 90.6 UCLA 31.6 ASES 89.8
Denard	115	98.9	UCLA 15.8 ASES 41.7		UCLA 30.0 ASES 81.6
Paxton	15	120	ASES 48.3	ASES 79.9	ASES 79.4
<b>This study</b>	<b>23</b>	<b>126.7</b>	<b>JOA 59.7</b>	<b>JOA 91.5</b>	<b>JOA 90.6</b>
Besnard	64	97.2	CS (raw) 30.9 CS (adjusted) 37.6	CS (raw) 80.0 CS (adjusted) 99.7	CS (raw) 76.7 CS (adjusted) 98.8

Short term outcomes was maintained until final follow up.  
The clinical results of final follow up were inconsistent with other reports.



# Connection with the clinical results and re-tear

Reference	Re-tear rate	Connection with the clinical results
Dohke	42%	JOA: no significant difference Only for the massive tear, complete repair was superior to retear
<b>This study</b>	<b>43.5%</b>	<b>JOA: no significant difference</b>
Pietro	46.3%	Patients with an intact supraspinatus showed superior results
Plachel	45%	Repair failure negatively affected clinical results
Heuberere	50%	CS : omplete repair is superior to retear, UCLA : no significant difference

- Function of the rotator cuff in maintaining the centralization of the humeral head against the glenoid fossa is well preserved in shoulders even with a small defect. *Sugaya et al. JBJS 2007*
- Tendon preservation at the middle facet was a predictor of good clinical outcomes. *Nakamura et al. Arthroscopy 2016*

It is necessary to discuss every tear size and Invention not to grow big even if repaired rotator cuff tear again



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# Fatty infiltration

- Fatty infiltration significantly progressed up to 10 years postoperatively  
*Jost 2009, Zumstein 2008*  
**+  
This study**
- SSP tendon repair integrity was statistically significant associated with less fatty infiltration of the ISP  
*Herve 2019, Bartle 2012, Laurent 2017*  
**+  
This study**
- Fatty infiltration of the supraspinatus, infraspinatus, and subscapularis muscles increased postoperatively despite tendon healing  
*Nich 2009*
- In the retear group the fatty infiltration showed a significantly higher value compared to the intact group of small or medium tear but large tear.  
*Bartle 2012*



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# Muscle atrophy

- Once healing of the repaired tendons was achieved, supraspinatus muscle atrophy never worsened.
- In contrast, when a re-tear occurred, supraspinatus muscle atrophy always worsened.
- Significant change was not detected in average PCSA of all of the cases and intact group. But it was detected in re-tear group .

*Bartle 2012, Nich 2009*

***This study***



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# Relation between the clinical results and structural outcome

- The sum of functional scores was negatively correlated with muscle atrophy of the supraspinatus or subscapularis muscle

*Shen 2008*

- The CS and SSV were significantly inferior for shoulders with fatty infiltration of stages III to IV . The CS was lower in cuff tear arthropathy and correlated with infraspinatus fatty infiltration.

*Collin 2019*

- An fatty infiltration higher than stage 2 of the infraspinatus muscle correlated inversely with the postoperative Constant score.

*Bartl 2012*

- There was not the significant correlation between fatty infiltration or muscle atrophy and clinical results

***This study***



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# 【Conclusion】

- The re-tear rate was 43.5%.
- The long term clinical outcomes were not affected by re—tears the exception of active flexural ROM.
- Fatty infiltration and Muscle atrophy of rotator cuff significantly progressed in re-tear group.
- Significant difference was recognized about between two groups in presence of re-tear at final follow up in fatty infiltration
- There was not the significant correlation between fatty infiltration or muscle atrophy and clinical results



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