

# **The preoperative prognostic factors influencing of postoperative results of manipulation under anesthesia for frozen shoulder**

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# **COI Disclosure Information**

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I have no financial relationships to disclose.

# 【Introduction】

- Manipulation under anesthesia (MUA) for frozen shoulder is a useful treatment that can perform in an outpatient
- Many good results have been reported regarding the postoperative results of MUA<sup>1)2)</sup>
- However, **we often experience poor results** such as persistent pain and limitation of range of motion
- The purpose of this study is to investigate preoperative prognostic factors influencing of postoperative results of MUA for frozen shoulder

# 【Materials and Methods】

## <Patients>

- Frozen shoulder (passive flexion  $\leq 135^\circ$ )<sup>3)</sup>
- MUA using C5, 6 blocks under the ultrasound guidance<sup>1)</sup>  
(2014.2~2018.6)
- 53 patients 57 shoulders
  - 28 males 31 shoulders
  - 25 females 26 shoulders
- Mean Age :  $57.5 \pm 10.0$  years old (42~83)



# 【Materials and Methods】

## ◁Evaluation items▷

- Demographic data

Age, Sex, Disease period, Diabetes mellitus (DM), Hypertension (HT), Hyperlipidemia (HL), Thyroid disease, Steroid medication, Smoking

- Preoperative range of motion (ROM)

Active flex, passive flex, active external rotation (ER), active internal rotation (IR)

- Preoperative clinical scores

Constant shoulder score

University of California at Los Angeles Shoulder score (UCLA)

Numerical Rating Scale (NRS)

# 【Materials and Methods】

## <Group>

- Good group

Other than the poor group

- Poor group

Multiple times MUA or Last NRS  $> 1/2$  before MUA

## <Statistical examination>

- Evaluation items were compared between the good and poor group

- $P < 0.05$  were considered as significant differences

# 【Results】

• **Good group** : 40 patients 42 shoulders **(73.7%)**

• **Poor group** : 13 patients 15 shoulders **(26.3%)**

Multiple times MUA 9 patients 11 shoulders

Last NRS > 1/2 before MUA 4 patients 4 shoulders



Details of 4 patients

NRS (Before MUA ⇒ Last MUA)

①8⇒5 ②9⇒6 ③5⇒3.5 ④2⇒2

# 【Results (Univariate analysis)】

	Good group (N=42)	Poor group (N=15)	P value
Age	57.9±9.2	56.5±12.1	0.65
Sex (male / female)	22 / 20	9 / 6	0.61
<b>Disease duration (M)</b>	<b>7.0±5.7</b>	<b>21.1±33.0</b>	<b>0.02</b>
<b>DM (yes / no)</b>	<b>8 / 34</b>	<b>8 / 7</b>	<b>0.01</b>
HT (yes / no)	6 / 36	1 / 14	0.44
HL (yes / no)	6 / 36	2 / 13	0.92
Thyroid disease (yes / no)	4 / 38	4 / 11	0.10
Steroid medication (yes / no)	5 / 37	0 / 15	0.16
<b>Smoking (yes / no)</b>	<b>8 / 34</b>	<b>8 / 7</b>	<b>0.01</b>



# 【Results (Univariate analysis)】

	Good group (N=42)	Poor group (N=15)	P value
active flex(° )	99.9±22.2	110.0±27.2	0.10
passive flex(° )	113.8±20.8	122.0±21.0	0.12
ER(° )	35.1±16.2	30.7±14.5	0.74
IR	L3.0±1.8	L2.7±1.8	0.63
Constant	39.9±11.5	39.5±14.6	0.65
UCLA	13.3±3.4	12.8±4.3	0.68
NRS	7.4±1.5	7.5±2.6	0.22

## Multivariate analyses

	Odds ratio	95% CI	P value
Disease duration(M)	1.03	0.95–1.13	0.47
<b>DM</b>	<b>9.18</b>	<b>1.87–45.0</b>	<b>0.006</b>
<b>Smoking</b>	<b>5.47</b>	<b>1.34–22.4</b>	<b>0.02</b>

# 【Association between **frozen shoulder and DM**】

- Vascular endothelial growth factor (VEGF) is overexpressed in DM patients and may promote angiogenesis in the synovium<sup>4)</sup>
- DM is the risk factor of frozen shoulder<sup>5)</sup>
- Frozen shoulder with DM had poor results after MUA compared to frozen shoulder without DM<sup>6)</sup>



**Frozen shoulder patients with DM may tend to be resistant to treatment**

# 【Association between frozen shoulder and smoking】

- No reports associated between frozen shoulder and smoking could be found
- Dupuytren's contracture is listed as a disease closely related to the smoking<sup>7)8)</sup>



- Both Dupuytren's contracture and frozen shoulder show deposition of type III collagen with a similar distribution of fibroblasts and myofibroblasts<sup>3)9)10)</sup>
- Smokers had a more severe degree of disease and dysfunction preoperatively than non-smokers in Dupuytren's contracture<sup>11)</sup>



**Smoking may be the poor prognostic factor of frozen shoulder**

# 【Conclusions】

- We investigated the preoperative prognostic factors influencing of postoperative results of MUA for frozen shoulder
- **DM and smoking** were the poor prognostic factors for postoperative results of MUA for frozen shoulder

# 【References】

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