

## Comparative Study of Arthroscopic and Microscopic Discectomy of Lumbar Disc Herniation in Teenagers

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### – Abstract –

**Purpose** : To compare clinical results and radiologic changes after arthroscopic and microscopic discectomy of lumbar disc herniation in teenagers who have no degenerative change.

**Materials and Methods** : From Jan 1990 to Aug 2001. 70 lumbar disc herniations were performed in patients below 20 years old who were admitted to our department, among these 67 cases (49: male, 18: female) were evaluated for at least 1 year. Their average age was 18.1 years (13 ~ 20 years). Forty-six received microscopic discectomy and 21 arthroscopic discectomy. Mean follow-up duration was 26.4 months (12 ~ 88 months).

**Results** : Clinical results and disc height change were compared between the arthroscopic and microscopic discectomy groups using the criteria of MacNab, and the relationship between disc height change and clinical results, excised disc volume, operative technique, body mass index and symptom duration were investigated. Clinically there was no significant difference between the two groups ( $p=0.425$ ), and their results were the same as those of adults. At the 1 year-follow up, disc height changes showed no correlation with the method of operation ( $p=0.996$ ) or the volume of the excised disc. Postoperative disc height in teenagers of lumbar disc herniation who showed no degenerative change significantly decreased with time, but no significant relation was observed between disc height changes and clinical results, operative technique, excised disc volume, body mass index, involved disc site or symptom duration between the two groups.

**Conclusion** : We believe that arthroscopic discectomy is an effective method, if the patients status permits, because it has the advantages of non-invasiveness, short hospitalization period and earlier return to normal life.

**Key Words** : Lumbar spine, Lumbar disc herniation, Arthroscopic disc excision, Microscopic disc excision, Teenager

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가  
2 5  
1 5  
1 4-5  
7 (10.4%)  
4-5 55 (82%) 가  
10% 20 5 - 1 11 (16.5%), 3-4  
10 1 (1.5%)  
1945 Wahren<sup>25)</sup> 12  
0.8~3.2%  
1.  
가 가  
10  
6  
2.  
1)  
diazepam 10mg pethidine 50  
mg (C-arm)  
가 10 . 1% lidocain  
8~10 cm 35~45  
가  
(C-arm image intensifier)  
가  
1990 1 2001 8 11 8  
20  
70 1 가 67  
( 49 , 18 )  
1341 5.2% 2)  
46 ( 1:200,000  
35 , 11 ) ,  
21 ( 14 , 7 )  
18.1(13~20) 26.4(12~88)  
3 2~3 cc 2% lidocain 가  
1 , 1 5  
1 가 2).

, 10

.

## 3. 가

## 1.

## 1) 가

## 1)

가

70 °

, , , , Macnab<sup>17)</sup>

18 (85.7%) 70 °

가 . 70 ° 1

40 (86.9%) 가 (Table 1).

. ( 100 ) , ,

, , , , ,

, , , , ,

, , , , 가

## 2)

13 (28.2%)

. [ 21 (100%) , 22  
(47.8%) 46 (100%) 가 (Table 1).= {(  
)} × 100] 가 .

가 , ,

## 3)

9 (42.8%) 가

10 point visual analogue scale

2 (9.5%) , 25

(54.3%) 5 (10.8%) (Table 1).

## 2) 가

## 4)

가

Macnab<sup>17)</sup>

, , , 4

Farfan<sup>4)</sup>

19 (90.4%), 41 (89.1%)

4-5

SPSS

ANOVA

16 (89%) 33 (89%)

repeated measure t-test

가 , 5 - 2 (100%) 8  
(88%)

가 (Table 2).

**Table 1.** Objective clinical results of Arthroscopic & Microscopic discectomy

Clinical	Degree	Arthroscopic group		Microscopic group	
		Preop	Follow-up	Preop	Follow-up
SLRT	0 °~ 30 °	9(42.9%)	0(0%)	21(45.7%)	1(2.1%)
	30 °~ 70 °	11(52.3%)	3(14.3%)	25(54.3%)	5(10.9%)
	Normal	1(4.8%)	18(85.7%)	0(0%)	40(87.0%)
Power Muscle	Fair-Zero	0(0%)	0(0%)	4(8.7%)	0(0%)
	Good	8(38.1%)	0(0%)	20(43.5%)	0(0%)
	Normal	13(61.9%)	21(100%)	22(47.8%)	46(100%)
Sensory disturbance	Marked	1(4.8%)	0(0%)	3(6.5%)	0(0%)
	Slight	8(38.1%)	2(9.5%)	22(47.8%)	5(10.9%)
	None	12(57.1%)	19(90.5%)	21(45.7%)	41(89.1%)

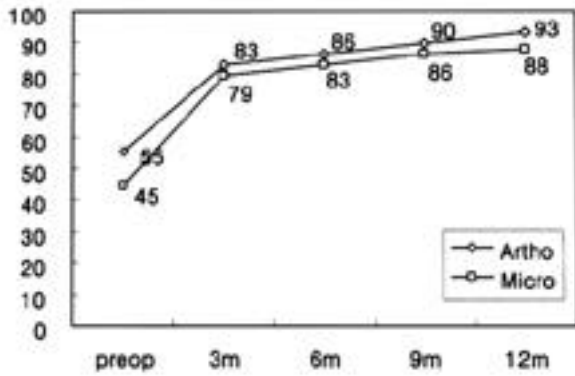
**Table 2.** Comparison of the clinical results between Arthroscopic and Microscopic discectomy groups (by Macnab's criteria)

Results	Arthroscopic group	Microscopic group
Excellent	14(66.7%)	25(54.3%)
Good	5(23.8%)	16(34.8%)
Fair	2(9.5%)	4(8.7%)
Poor	0(0%)	1(2.2%)

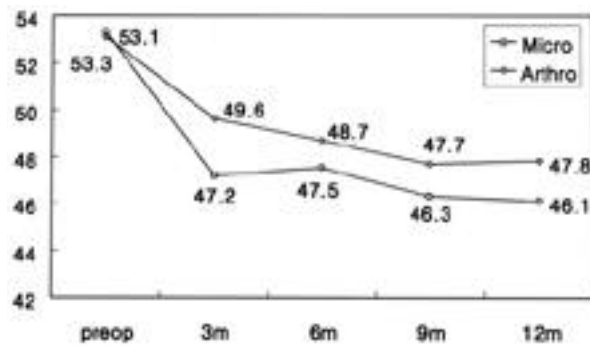
**Table 3.** Comparison of mean disc height change between Arthroscopic and Microscopic discectomy (by Farfan's method)

	Arthroscopic group	Microscopic group
Preop	53	53
Follow-up	48	46
Decreased rate	9.5%	13.2%

(p<0.05)



**Fig. 1.** Comparison of LBP score change between arthroscopic and microscopic discectomy.



**Fig. 2.** Comparison of mean disc height change between arthroscopic and microscopic discectomy. (by Farfan's method)

5)

56 93 83%  
46  
89 80%  
4-5 85% 79%  
5 - 81% 86%  
(Fig. 1).

(p=0.623).

1.5 cc 1 11.8%, 1.5cc  
2.5cc 11.7%, 2.5 cc 11.7%

(p=0.989).

4-5 55 , 5 -  
1 11 , 3-4 1  
가  
6 33 , 6 34  
1 9.9%, 12.3%  
(p=0.676).

(Table 3).

6)

Farfan 4)  
53 48 9.5%  
53 46 13.2%  
가

(p=0.996)(Fig. 2).

20(kg/m<sup>2</sup>) ; 23 , 20~24; 34 ,  
25~29; 9 , 30 ; 1 가

(p=0.055).

Macnab 17)  
6 , 1 ,  
39 , 21 ,

2.

1)

18 (85%)  
2 (9.5%) , 39  
(85%) 8 (17.3%) (Table 4).

2)

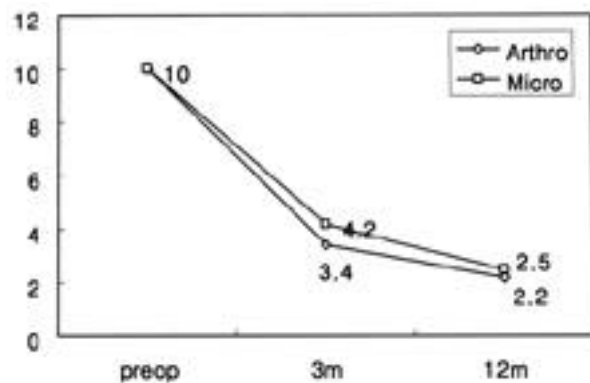
5 (23.8%) ,  
13 (28.2%) (Table 4).

**Table 4.** Subjective clinical results of Arthroscopic and Microscopic discectomy

Subjective symptom	Degree	Arthroscopic group		Microscopic group	
		Preop	Follow-up	Preop	Follow-up
Low back pain	Continuous severe	1 (4.8%)	0 (0%)	4 (8.7%)	0 (0%)
	Frequent mild	6(28.6%)	1 (4.8%)	20(43.5%)	0 (0%)
	Occasional mild	11(52.4%)	1 (4.8%)	15(32.6%)	8(17.4%)
	None	3(14.2%)	19(90.4%)	7(15.2%)	38(82.6%)
Radiating pain	Continuous severe	7(33.4%)	0 (0%)	13(28.2%)	0 (0%)
	Frequent mild	10(47.6%)	2 (9.5%)	28(60.9%)	2 (4.4%)
	Occasional mild	4(19.0%)	3(14.3%)	5(10.9%)	11(23.9%)
	None	0 (0%)	16(76.2%)	0 (0%)	33(71.7%)

**Table 5.** Complication of Arthroscopic and Microscopic discectomy

Complication	Athroscopic group	Microscopic group
Recurrence of previous Sx	3	4
Infection	0	0
Dural tear	0	1
Total	3(14.2%)	5(10.8%)

**Fig. 3.** Comparison of changes of VAS(visual analogue scale) between arthroscopic and microscopic discectomy.

3) visual analogue scale

10

3

3.4 , 4.2

, 12 2.2 , 2.5

(Fig. 3).

4-5

1 49 5 -

1

3.1 , 4.9

14.2% 10.8%

(p>0.05)(Table 5).

3

1

1

, 2

3-4

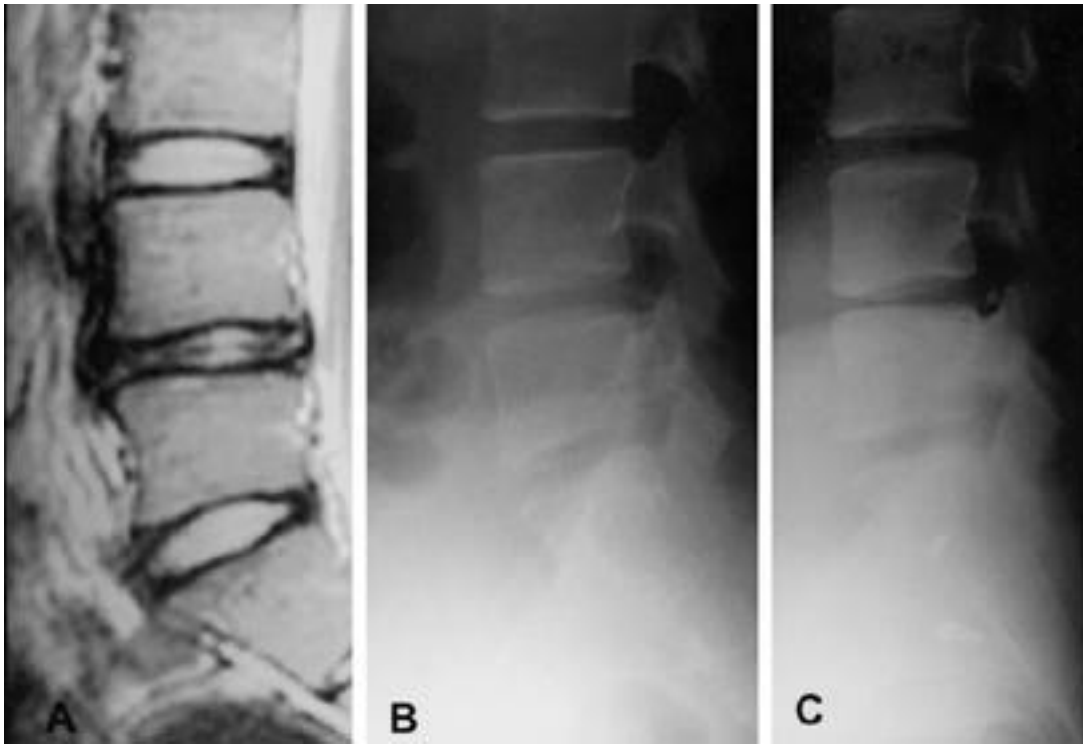
1 46 4-5

4

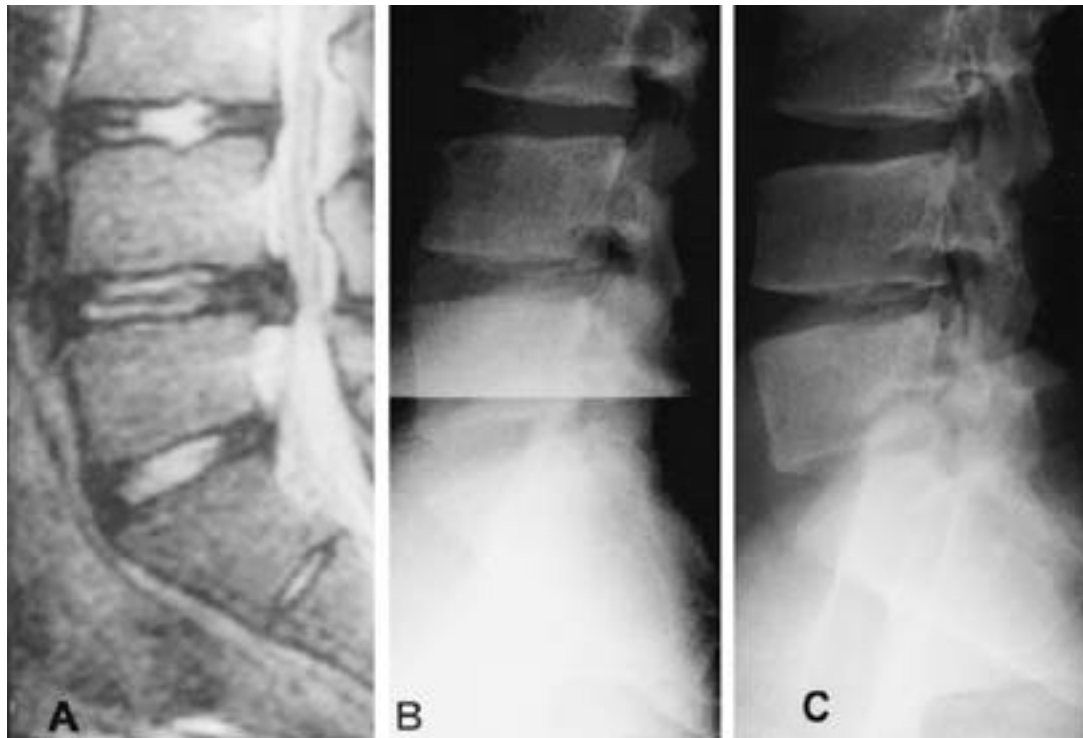
Lasegue

(protruded type)

2.4 cc



**Fig. 4.** 14-years-old female with Rt leg radiating pain. Preoperative MRI (A) showed the protruded disc herniation at L4-5. Lateral radiograph at 24 months follow-up after arthroscopic disc excision (C) showed decreased disc height in comparison with preoperative radiograph (B).



**Fig. 5.** 17-years-old male with Rt leg radiating pain and positive straight leg raising. Preoperative MRI (A) showed the extruded disc herniation at L4-5. Lateral radiograph at 26 months follow-up after microscopic disc excision (C) showed decreased disc height in comparison with preoperative radiograph (B).

24  
Macnab  
41  
7 (10.4%)  
100  
54  
10  
37  
(Fig. 4-B,C).  
10  
Lasegue  
2  
6).  
17  
2  
46 (97.8%)  
가  
26  
(38.8%)  
34 (50.7%)  
4-5  
(extruded type) (Fig. 5-A).  
1945 Wahren<sup>25)</sup> 12  
2.5 cc  
10  
26  
Macnab  
37  
100  
58  
47  
(Fig. 5-B,C).  
(minimal invasive spinal  
1,5,8,10,11,15,23)  
10  
가 0.8% surgery)  
3.2%  
12  
10  
가 Fusek<sup>7)</sup> 10  
가  
가  
가  
가  
20) 14%  
10  
가  
5.4%  
10  
가  
O 'connell<sup>19)</sup>  
30%  
Hahn<sup>9)</sup>  
Clarke  
4-5  
Cleak<sup>3)</sup>  
Epstein<sup>5)</sup> Kurihara<sup>16)</sup> 30%  
Parisini<sup>21)</sup>  
가  
1

가  
(subligamentous extruded)  
가  
5 - 1  
5 - 1  
Macnab<sup>17)</sup>  
, Grobler<sup>8)</sup> 87%,<sup>20)</sup> 81.5%  
60 (89.5%)  
Dabbs<sup>4)</sup>  
가  
al<sup>24)</sup>  
14) 5.9%  
Watts<sup>26)</sup>  
가  
9.5%  
13.2%  
(p=0.006)  
(p=0.996). (p=0.055),  
(p=0.989), (p=0.726)  
(p=0.676)  
2) 4-5  
16.9% 8.3%  
(p=0.002).  
10 가  
가

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가

가 10

가

10

: 1990 1 2001 8 20

70 1 가 67 ( :49, :18) 18.1(13~20)

, 46 , 21 26.4(12~88)

ANOVA repeated measure t-test

: Macnab 가 90.4%, 89.1%

4-5 89% 5 -

100% 88% 가 . 1

9.5% 13.2%

(p=0.006) .(p=0.996)

가 , , ,

: 10

가 10

: , , , , 10

: