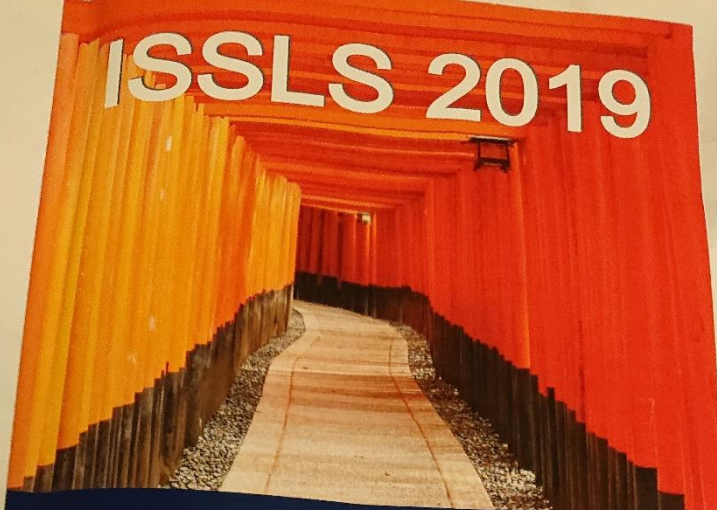
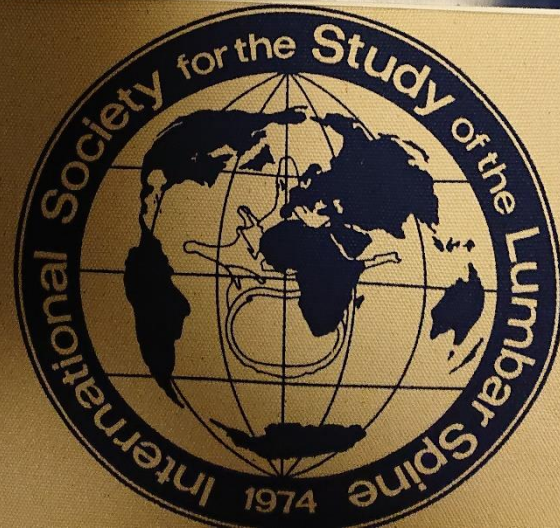


# ISSLS 2019



## 46<sup>th</sup> Annual Meeting Kyoto JAPAN

The International Society for  
the Study of the Lumbar Spine



ISSLS  
2019

Kyoto  
JAPAN

The 46th Annual Meeting of the  
International Society for the  
Study of the Lumbar Spine

Save the date  
June 3-7, 2019

Yano, M.D., Ph.D.  
Hori, M.D.

2019 Kyoto, JAPAN

A panel of seven men in suits is seated at a long table on a stage. Each man has a laptop and a microphone in front of him. They appear to be participating in a panel discussion or a Q&A session. The man on the far left is looking towards the center, while the others are looking down at their laptops or towards the audience. The background is the large projection screen.



# SP23

## Multimodal Analyses Were Required to Understand the Complaints of Adult Spinal Deformity Patients

**SP-23**

**Purpose**

- Investigate spinal deformity (ASD) criteria, the University Disability Index (UDI) as frequently used and established in the analysis of clinical results, and the relationship for health-related quality of life (HRQL) associated with surgical spinal deformity.
- Investigate, especially in the clinical observation, there are correlations between different patient-reported outcomes (PROs) for the evaluation of health conditions of ASD patients.
- According to hospital records, and QOL (QoL) and ASD are supposed to be the threshold of incidence, and severe disability, respectively, but surgical treatment are sometimes required for the ASD patients with low QOL scores.
- The purpose of this study was to investigate the features of the ASD patients who underwent corrective surgery using UDI, even with preoperative low QOL scores.

**Materials and Methods**

- This is a retrospective review of prospectively collected, single-center database of consecutively enrolled ASD patients.
- Inclusion criteria were age ≥ 18 years, surgically treated ASD, and fusion range from thoracic spine to pelvis.
- 10 of 41 these ASD patients, QOL scores, SRS-22 (function, pain, self-image, mental health, social), and Numerical Rating Scale (NRS) for low-back/neck/leg/arm pain, assessed preoperatively and postoperatively, and ASD data were reviewed retrospectively.
- The ASD patients with preoperative QOL less than 20% were categorized as low QOL group (Group L), and other HRQLs, moderate/severe (SRS-22 NRS) were compared with the ASD patients with QOL more than 20% (Group H).
- Pathologies of spinal deformity in each group were also compared (Group's L/H).

**Results**

- Among 28,456 patients (17 males, 17 females, average age 61.8 years), 10 patients (11.4%), 8 males, 2 females, average age 63.6 years (Group H) included 3.9% patients (62.2%, 21 males, 30 females, average age 60.9 years). In the patients, pathologies of the deformity in Group L were 7 (68.8%) as degenerative kyphosis (K1), 1 (10.0%) as scoliosis, 2 (20.0%) as Parkinson (P), 1 (10.0%) as idiopathic scoliosis (S), while 17 (42.2%) in K1, 17 (100%) in K2, 2 (11.8%) in degenerative kyphosis (K1), 1 (5.0%) in scoliosis, and 1 (5.0%) in P in Group H.
- Average QOL score, SRS-22 function, pain, self-image, mental, social, NRS low-back/neck/leg/arm pain in Group L were 14.8, 5.2, 4.4, 2.4, 2.8, 3.8, 4.6, 2.2, 3.2, 4.3, respectively, while they were 33.4, 12.2, 2.2, 3.3, 2.4, 2.4, 7.8, 3.8, 3.9, and 2.7 in Group H, respectively (Table 2).
- A total of 4 items were significantly higher (p < 0.05) in Group H compared SRS-22 self-image (p < 0.001) and NRS low-back/neck/leg/arm pain (p < 0.001).

**Conclusion**

- The UDI index is often used as a threshold of severe disability in the HRQL evaluation, however, the QOL assessment cannot detect the severity of clinical symptoms and/or patient-reported disability.
- Additional evaluations are necessary to clearly understand the complaints and troubles of the patients with adult spinal deformity.

# GP35

## The titan coated PEEK cage maintains better graft bone contact with the endplate than PEEK cage at six months after PLIF surgery - a multicenter, prospective, randomized study-

**Alps Hamanako Spine Group**

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**<Background>**

Posterior lumbar interbody fusion (PLIF) is widely used as safe and effective surgical procedure for lumbar canal stenosis due to degenerative unstable lumbar spine. Most of surgeons use the PEEK (polyetheretherketone) interbody cage to avoid a cage subsidence because of similar elasticity to the cortical bone. On the other hand, several basic researchers said that titanium has good bone affinity. Therefore titanium coated PEEK (Ti/PEEK) cage expected to have both characters has been used more in recent years. However, previous reports did not reveal the significant difference of bony fusion rate between PEEK and Ti/PEEK. This study aimed to investigate the interbody fusion rate between PEEK and Ti/PEEK cage groups evaluated by CT.

**PEEK**

- F-Model PEEK, 4 GPa (cortical bone of endplate: 10-12 GPa)
- E-Model TiAl6V4, 90-110 GPa
- Long history of clinical use
- X-ray transparency / no artefacts

**Porous Coating**

- improved primary stability due to rough surface
- improved long term stability due to bone ingrowth
- long clinical experience with PEEK

**<Objective>**

This study aimed to investigate the characters of bone fusion between PEEK and Ti/PEEK cage by using CT.

**<Materials and Methods>**

161 enrollment  
 128 Finished by follow up  
 Finished CT evaluation  
 58 PEEK  
 54 Ti/PEEK

Blinded evaluation of bony fusion in CT was performed by 4 independent physicians at post OP 2M, 4M, 6M and 12M. The presence of cage subsidence (subsided ≥ 1mm from within IMJ) and pedicle screw loosening (existence of loose zone around the screws) were also evaluated in CT by the four physicians.

The physicians previously received a training about CT evaluation.

The case of rate of agreement more than 75%, the evaluation was finalized and in the case of less than 50%, decided the final evaluation by the discussion of the four at later meeting.

\*1/2 contact of graft bone was defined as fusion (Fusion in cranial and non fusion in caudal)

**<Results>**

Bone contact rates in center slice

Time	PEEK (%)	Ti/PEEK (%)
2M	42	45
4M	55	58
6M	68	72
12M	78	82

\*P=0.023

Cage subsidence

Time	PEEK (%)	Ti/PEEK (%)
2M	11	12
4M	13	14
6M	14	15
12M	16	17

Pedicle screw loosening

Time	PEEK (%)	Ti/PEEK (%)
2M	5.2	5.4
4M	6.0	6.1
6M	8.8	9.1
12M	14	14

**<Discussion>**

2 Prospective RCTs

Study	Group	12M CT	12M XP
1	PEEK	94.4%	93.3%
	Ti/PEEK	91.7%	91.7%
2	PEEK	94.4%	93.3%
	Ti/PEEK	91.7%	91.7%

PEEK and Ti/PEEK Both showed good fusion rates No significant different

**In this study**

By using Ti/PEEK cage, a good contact rate between graft bone and endplate were maintained at 6M post OP.

**<Conclusions>**

- Our study using more strict evaluation system in CT images showed the lower rate of bony contact rate between endplate and graft bone.
- Our findings also showed graft bone was temporally absorbed from second months in both groups and further absorbed to sixth month in the PEEK group.
- On the other hand, in the Ti/PEEK group, graft bone was absorbed in the same manner, but relatively maintains bone graft contact even at sixth month after the surgery.

COI disclosure: This study was performed with financial support by H Brain Ancestry.

# GP17

## Extensive spinal fusion surgery to correct severe deformities in patients with Parkinson's disease or Parkinson's syndrome: clinical outcomes over a five-year follow up

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# GP18

## Geographic Difference during Minimally Invasive Spinal Surgery (MISS)

**HSS**

**INTRODUCTION**

- Prevalence of minimally invasive (MISS) with microgravity (MG), vector-modified pedicle (VMP), and anteriorly placed pedicle (APP) are used for spine surgery to correct of severe spinal deformities.
- Regional variation in the use of the various techniques during the MISS is expected to exist for many reasons.
- Purpose: To reveal the geographic difference in the use of the various techniques during the MISS.
- Methods: We analyzed the MISS data from 10 hospitals in Japan and 10 hospitals in the United States.

**RESULTS**

- MISS was used in 10 hospitals in Japan and 10 hospitals in the United States.
- The use of VMP was significantly higher in the United States than in Japan (p < 0.05).
- The use of APP was significantly higher in Japan than in the United States (p < 0.05).
- The use of MG was significantly higher in Japan than in the United States (p < 0.05).

**CONCLUSION**

- There is a geographic difference in the use of the various techniques during the MISS.
- The use of VMP was significantly higher in the United States than in Japan.
- The use of APP was significantly higher in Japan than in the United States.
- The use of MG was significantly higher in Japan than in the United States.

**GP16**

**Conclusion**

- Surgical intervention in PD patients with spinal disorders leads to good outcomes in the short term, however, the condition of the patients deteriorated because of continuation 2 years after surgery.
- Revision free fall back, walking speed, and quality of life were significantly improved after revision surgery.
- Microgravity (MG), vector-modified pedicle (VMP), and anteriorly placed pedicle (APP) are used for spine surgery to correct of severe spinal deformities.

**GP17**

**Introduction**

- Postural disorders associated with Parkinson's disease or Parkinson's syndrome (PD) and spinal imbalance and deformity and can result in significant disability.
- Spinal surgery in PD patients has a high incidence of complications, and revision surgery have been reported.

**Objective** : to clarify the mid-term results of extensive spinal fusion surgery in PD patients.

**Materials and Methods**

Exclusion : operation for neurological symptom.

**Subjects**

- Consecutive patients with PD or atypical parkinsonism.
- Underwent extensive fusion surgery to correct severe spinal deformities in patients with PD.
- more than 5 years prior.

**Survey Items**

- Background
- Operative parameters
- Complications (Neurological and mechanical)
- Radiograph
- Clinical outcome (indoor ADL, independent, cane, walker, wheelchair)

**Results**

- 18 cases
- mean age 71.2 years
- Operation time : 280-560 min. (mean 422 min)
- blood loss : 423-4092g (mean 1011 g)
- UV : T2-4 Dis, T6-7 Dis, T6-10 Sac, T10-11
- UV : pedicle : 17/5 (with microgravity 15/5), 4/16
- Fusion levels : 6-16 levels (mean 11.7)
- 3-column osteotomy : 11 (6 PGO, 6 PVOR)

**Postoperative complications**

Complication	Number
Neurological	2
Mechanical	1
Medical	1
Total	4

**Reoperation**

Reoperation	Number
Neurological	2
Mechanical	1
Medical	1
Total	4

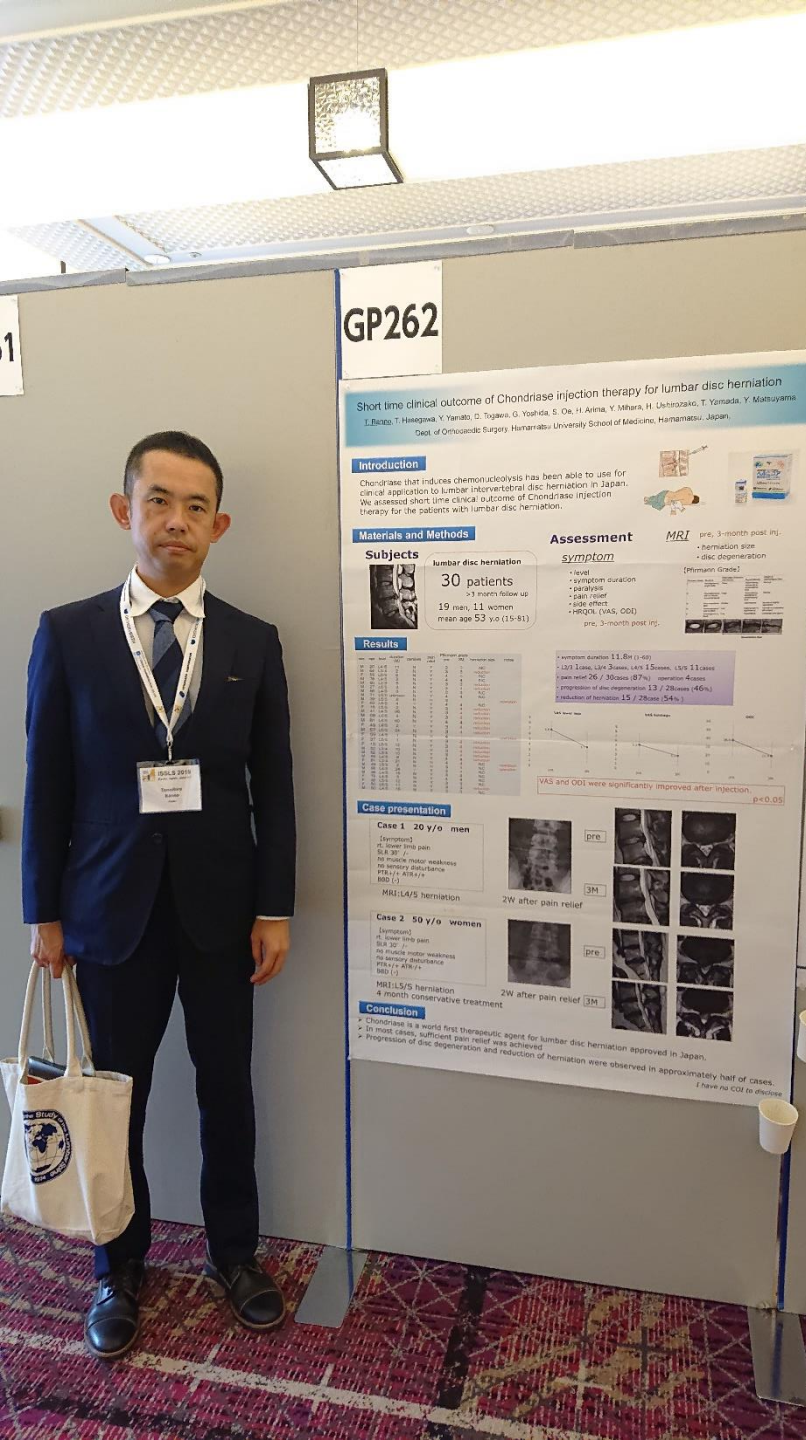
**Indoor ADL**

Time	Pre-Op	1Y	2Y	3Y	4Y	5Y
Total	18	17	15	15	11	11
with microgravity	10	9	8	8	6	6
without microgravity	8	8	7	7	5	5

**Conclusion**

- Surgical intervention in PD patients with spinal disorders leads to good outcomes in the short term, however, the condition of the patients deteriorated because of continuation 2 years after surgery.
- Revision free fall back, walking speed, and quality of life were significantly improved after revision surgery.





## GP262

### Short time clinical outcome of Chondrase A injection therapy for lumbar disc herniation

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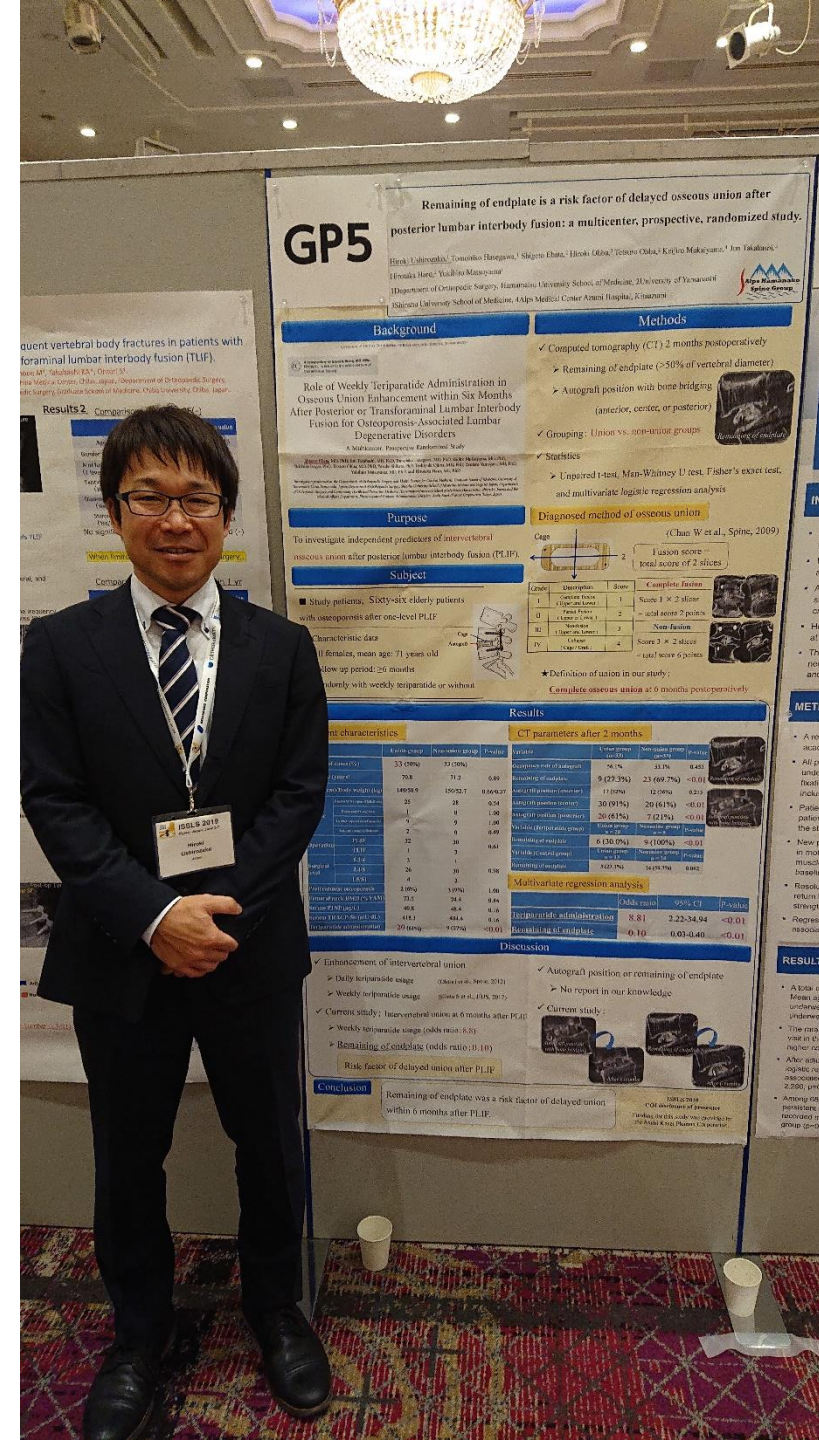
**Introduction**  
Chondrase A that induces chemonucleolysis has been able to use for clinical application to lumbar intervertebral disc herniation in Japan. We assessed short time clinical outcome of Chondrase A injection therapy for the patients with lumbar disc herniation.

**Materials and Methods**  
Subjects: lumbar disc herniation, 30 patients (19 men, 11 women, mean age 53 yo (15-81)).  
Assessment symptom: level, symptom duration, radicular pain, pain relief, side effect, MRI (VAS, ODI) pre, 3-month post inj., disc degeneration (Mishima Grade).

**Results**  
Symptom duration: 11.6 (1-40) mo.  
VAS score: 1.0 (0-10) pre, 0.5 (0-10) post.  
ODI score: 15/28 (54%) pre, 10/28 (36%) post.  
VAS and ODI were significantly improved after injection (p<0.05).

**Case presentation**  
Case 1: 20 yo men. Symptom: lower limb pain, SLR (+), motor weakness, sensory disturbance, MRI (L4/5) (B2).  
Case 2: 50 yo women. Symptom: lower limb pain, SLR (+), motor weakness, sensory disturbance, MRI (L4/5) (B2).

**Conclusion**  
Chondrase A is a world first therapeutic agent for lumbar disc herniation approved in Japan. In most cases, sufficient pain relief was achieved. Progression of disc degeneration and reduction of herniation were observed in approximately half of cases. If we use ODI to disclose.



## GP5

### Remaining of endplate is a risk factor of delayed osseous union after posterior lumbar interbody fusion: a multicenter, prospective, randomized study.

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**Background**  
Endplate is a risk factor of delayed osseous union after posterior lumbar interbody fusion (PLIF).  
**Purpose**  
To investigate independent predictors of intervertebral osseous union after posterior lumbar interbody fusion (PLIF).  
**Subject**  
Study patients: 501 (263 elderly patients with osteoporosis after one-level PLIF).

**Methods**  
Computed tomography (CT) 2 months postoperatively.  
Remaining of endplate (<50% of vertebral diameter).  
Autograft position with bone bridging (anterior, center, or posterior).  
Grouping: Union vs. non-union groups.  
Statistics: Unpaired t-test, Mann-Whitney U test, Fisher's exact test, and multivariate logistic regression analysis.

**Diagnosed method of osseous union**  
Lusion score (total score of 2 slices).  
L1: Complete fusion (Score 3 x 2 slices = total score 6 points)  
L2: Partial fusion (Score 2 x 2 slices = total score 4 points)  
L3: Non-fusion (Score 1 x 2 slices = total score 2 points)

**Results**  
CT parameters after 2 months.  
Multivariate regression analysis.  
Discussion: Enhancement of intervertebral union, Autograft position or remaining of endplate, Current study: Intervertebral union at 6 months after PLIF.

**Conclusion**  
Remaining of endplate was a risk factor of delayed union within 6 months after PLIF.



## GP198

### Poor flexibility is negative predictive factors of bone union in adolescent athletes with spondylolysis

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**Introduction**  
The major concern after the treatment of spondylolysis is ensuring play and previous activity levels and preventing the recurrence of spondylolysis. Lower back defect is important to recurrence. If athletes have terminal stage spondylolysis, their contralateral pars stress increases as they play. Physical therapy at the initial stage of the defect (Fujiki 2004). Athletes with spondylolysis do physical activity. The purpose of this study was to identify not only radiological findings to spondylolysis but also the physical characteristics associated with "bone union" following conservative spondylolysis treatment among adolescent athletes.

**Material and Methods**  
Retrospective Study: We enrolled 227 patients with very early, early or progressive lumbar spondylolysis received conservative treatment. 143 patients with 246 defects were included in the final analysis.  
The analysis was approved by the Ethics Committee of Kitagawa Municipal General Hospital.  
Radiological findings:  
- Severity: very early, early, progressive, terminal (Fujiki 1).  
- Continuity of the contralateral pars intervertebral defect at 5 months after diagnosis was evaluated.  
- Physical characteristics: muscle strength, flexibility, and body mass index (BMI) were measured.  
- Physical characteristics were compared between the union and non-union groups.  
- Logistic regression analysis was performed to compare the union and non-union groups.  
- Physical characteristics were compared between the union and non-union groups.  
- Physical characteristics were compared between the union and non-union groups.

**Results**  
The union rate was significantly lower in the early and progressive groups compared to the very early group (p<0.05).  
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The union rate was significantly lower in the early and progressive groups compared to the very early group (p<0.05).

**Conclusion**  
Poor flexibility was a negative predictive factor of bone union in adolescent athletes with spondylolysis.



