



# EVALUATION OF THE PREFERENCES OF TURKISH SPINE SOCIETY MEMBERS TOWARDS ADOLESCENT IDIOPATHIC SCOLIOSIS TREATMENT

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## ABSTRACT

**Objective:** Controversies exist in the follow-up and treatment of adolescent idiopathic scoliosis (AIS). Thus, it is important to identify the attitudes of physicians from a national perspective to determine the status and problems associated with AIS treatment.

This study aimed to evaluate the preferences of the Turkish Spine Society (TSS) physicians towards AIS treatment by investigating differences in AIS monitoring and treatment through a web questionnaire survey.

**Materials and Methods:** This cross-sectional observational study employed a simple questionnaire focusing on AIS, which was created using Survey Monkey. Twenty questions, which were deemed as the most controversial topics of AIS, were constructed by the authors. A consensus was considered when 70% of the respondents provided the same answer.

**Results:** A consensus was obtained among TSS physicians for using brace as conservative treatment and the brace was used 22 hours daily. Most TSS physicians agreed about the surgical indication of AIS; however, there was a disagreement about the indication of brace treatment.

**Conclusion:** TSS physicians had a consensus on using brace in AIS treatment. However, there was a disagreement towards the indication of the brace treatment. The results demonstrated a consensus about surgical management and surgical experiences. However, a disparity existed about the time by which activities and contact sports are allowed.

**Keywords:** Adolescent idiopathic scoliosis, brace, surgery, spine, survey

## INTRODUCTION

Adolescent idiopathic scoliosis (AIS) occurs in 3% of the general population for curves between 10° and 20° and 0.3% for curves >30°. Of those affected, 10% warrant some treatment, and only 0.1% require surgical intervention<sup>(1,2)</sup>. Suh et al.<sup>(3)</sup> conducted a study over a 9-year period of school-based screening to investigate the scoliosis prevalence in the Korean population, and they found that AIS affected 3.26% of 1,134,890 school children. Curves >30° are up to 10 times more prevalent in girls than in boys. Men and women are equally likely to have minor scoliosis of approximately 10°, but in women, the condition is 5-10 times more likely to progress to a more severe disease, possibly requiring treatment<sup>(2,4)</sup>.

The Turkish Spine Society (TSS), which is a national association of healthcare professionals (orthopaedic surgeon, neurosurgeon,

physical therapy physicians, etc.) working in spine diseases, has been carrying out scientific activities for 28 years. Many controversial topics exist in the follow-up and treatment of AIS. Thus, it is important to identify the attitudes of physicians from a national perspective to determine the state and problems associated with AIS treatment. Therefore, this study aimed to evaluate the preferences of TSS physicians towards AIS treatment by investigating differences in AIS monitoring and treatment through a web questionnaire survey.

## MATERIALS AND METHODS

In this cross-sectional observational study, which performed between August 2016 and October 2016, a simple questionnaire focusing on AIS was created using Survey Monkey (Table 1). Twenty questions, which were considered the most controversial topics of AIS, were constructed by the authors.



**Table 1.** The 20 question survey fulfilled by the Turkish Spine Society members.**1. What is your limit of Cobb angle for surgery indication for thoracic AIS ?**

- 40 degrees
- 45 degrees
- 50 degrees

**2. What is your limit of Cobb angle for surgery indication for lumbar AIS?**

- 35 degrees
- 40 degrees
- 45 degrees

**3. What is your instrumentation preference for thoracic AIS surgery?**

- Hook + screw
- Monoaxial screw
- Polyaxial screw
- Mono + polyaxial screw

**4. What is your rod preference for thoracic AIS surgery?**

- Ti
- Stainless steel
- Chrome-cobalt

**5. What is the post-operative infection rate of thoracic AIS surgery?**

- 1%
- 2%
- 3%
- 4%
- 5%

**6. What is the rate of paraplegia in thoracic AIS surgery?**

- 1/100
- 1/1000
- 1/5000
- 1/10000
- 1/20000

**7. Are the swimming, pilates, yoga or exercise involved in AIS conservative treatment?**

- Yes
- No

**8. Do you use brace at conservative treatment of AIS?**

- Yes
- No

**9. AIS, while M: 0 R: 0, if the curvature is less than 35 degrees, do you start the brace treatment without 5 degree progression?**

- Yes
- No

**10. What is your daily use time preference for brace treatment?**

- 22 hours
- 16 hours
- only night

**Table 1** contiuned

**11. How do you explain benefit of the brace treatment to the patients family?**

May reduce the progression of AIS curve

May stops the progression of AIS curve

May reduce of AIS curve

**12. M:+1 year , R: 3-5 , 45°- 60° Thoracic AIS . Surgical treatment should be performed in .... year?**

1

2

3

4

**13. M:+2 year , R:5 , AIS. Which cobb angle will occur the life threatening problems?**

45

60

70

80

100

**14. How many weeks after surgery can the patients begin to school?**

3 weeks

4 weeks

6 weeks

8 weeks

**15. How many months after surgery can the patients begin to cycling?**

1.5 months

3 months

6 months

9 months

**16. How many months after surgery can the patients begin to contact sports (football, basketball)?**

2 months

4 months

6 months

9 months

**17. How many hours the operation time of T2 to L3 instrumentation? (start and end of the anesthesia )**

3 hours

4 hours

5 hours

6 hours

7 hours

**18. Do you perform the operation with wake up test without neuromonitoring?**

Yes

No

**19. If there is 60% flexibility in the thoracic AIS (between 45 and 60 degrees), how many percentage of correction can be expected?**

70%

80%

90%

100%

**20. What is the most important things for the patient after surgery?**

Image in the mirror

Radiology

The responses were arranged as multiple choices. A unique link to the survey was provided in the e-mail and sent to TSS physicians. The TSS members who fulfilled the questionnaire were included in the study. A progress bar that stated the percentage of successfully finished pages was included, and progress to the next page was only possible when all questions were answered. All questions included the option “no answer”. The questionnaire could only be filled in once and only within 14 days. After 7 days, a reminder e-mail was sent to all non-responders. A consensus was attained when 70% of the respondents provided the same answer. We did not use any statistical analysis in the study.

## RESULTS

A total of 103 respondents who completed the survey were included in this study. The respondents were orthopaedic surgeons, neurosurgeons and physical therapy physicians (82%, 17% and 1%, respectively).

Majority of the respondents answered 45° (43%) as the surgical indication for thoracic AIS, while it was 40° (52%) for lumbar AIS. Many respondents preferred to use polyaxial screws (68%) over monoaxial screws or hybrid constructs, and they preferred titanium rods (64%).

The postoperative infection rate was mostly responded as 1% (51%), while the paraplegia rate was responded as 1/1,000 (52%). We did not find a consensus among TSS physicians about the effect of swimming, Pilates, yoga or exercises on the conservative management of AIS (yes/no; 48% vs 52%). However, brace treatment was the most commonly used conservative treatment method for AIS (78%). Most respondents believed that brace treatment may stop the curve progression (73%) in AIS, and they used brace treatment for 22 hours a day (74%). Nevertheless, no consensus was found among respondents about beginning brace treatment in a Risser grade 0 patient with curve <35° without 5° progression (yes/no; 60% vs 40%). We also asked some case examples (questions 12 and 13). Most respondents believed that in a Risser grade 3-5 patient with 45° to 60° thoracic Cobb angle, surgical treatment should be performed within 1 year (80%). By contrast, we did not observe a consensus about the degree of Cobb angle, which may result in life-threatening problems (question 13).

TSS physicians usually allow their patients to go to school at 3, 4 or 6 weeks after surgery (36%, 23% and 30%, respectively). In addition, no consensus was noted about the time of beginning cycling or contact sports, but most physicians allow their patients to begin cycling and contact sports 3 and 6 months after surgery, respectively.

Most respondents prefer using neuromonitoring during surgery (69%). The operation time for a T2 to L3 instrumentation varies between 4 and 6 hours. For a patient with 60% flexibility and 45° to 60° thoracic Cobb angle, majority of the surgeons expected an 80% correction rate (60%). In the last question, majority of the respondents declared that one's reflection in

the mirror is the most important thing for the patients after surgery compared with radiology (94% vs 6%).

## DISCUSSION

The most important study finding was observing a general consensus about the surgical treatment of AIS while detecting some disagreements about the conservative management of AIS. The general indications for thoracic and lumbar AIS as well as fixation method and rod materials did not differ among respondents. The rates of postoperative infection and paraplegia were also similar among respondents. However, our results demonstrated a disagreement about the preferences of conservative management. Most respondents believed that brace treatment is an effective non-operative management of AIS. Nevertheless, there was no consensus about beginning the brace treatment; for example, in a patient with Risser grade 0 and curve <35° with <5° progression, 60% of the respondents choose to start brace treatment, while 40% did not choose this treatment.

In 2013, Lehman et al.<sup>(5)</sup> created a survey about the treatment of AIS among 23 expert surgeon-researchers who are members of the spinal deformity study group. This study concluded that modern posterior instrumentation allows surgeons to recommend earlier return to sports after fusion for AIS, with the majority allowing running by 3 months and noncontact (gym class, swimming) and contact sports (basketball, volleyball) by 6 months<sup>(5)</sup>. Our results showed that TSS physicians mainly allowed cycling 3 weeks after AIS surgery, while they allow beginning contact sports at 6 months after surgery. However, we did not encounter a consensus about the exact time of beginning sports activities and contact sports among TSS physicians. TSS physicians similarly allow patients to begin cycling in 3 or 6 months and to begin contact sports in 6 or 9 months.

Most investigators who have studied the impairment of pulmonary function in scoliosis generally agree that a Cobb angle >90° greatly predisposes to cardiorespiratory failure, and lung function abnormalities are detectable when a Cobb angle is >50° to 60° and lung function abnormalities are mainly of the restrictive type<sup>(4,6-8)</sup>. In our study, the responses vary between 60°, 70°, 80° and 100° (20%, 20%, 31% and 27%, respectively). Scoliosis is also an image problem for young people. Self-image, as measured by patient responses on a validated questionnaire scored from 1 (best) to 6, was significantly worse for scoliosis patients than controls<sup>(9)</sup>. Self-image is decreased during the treatment period for both patients who used brace and underwent surgery. After brace treatment, patients' condition returned to normal. At an average of 7 years after surgery, small differences persisted for patients who underwent surgery, and the differences were characterised as probably “more statistical than practical”<sup>(9)</sup>. Moreover, respondents agreed that one's reflection in the mirror is more important than that in the radiological view.

Spinal cord complications occurred in 18 patients in the SRS series, all of which were incomplete spinal cord injuries. The posterior (0.21%) and combined (1.12%) groups each had nine complications. No spinal cord complications were noted in the anterior group. The differences in spinal cord complication rates between the combined and anterior procedures, as well as combined and posterior procedures, were statistically significant, but not between anterior and posterior procedures. On the contrary, wound infection was found in 0.17% and 1.37% of the patients following anterior and posterior spinal fusion surgery, respectively, according to the SRS series. In the present, TSS physicians also reported similar infection and paraplegia rates after AIS surgery.

Piantoni et al.<sup>(10)</sup> reported the results of their survey in which 497 National Spine Society members in Argentina were evaluated. They observed that 95.5% of the surgeons prescribed TLSO and indicated wearing of brace 20.6 hours daily<sup>(10)</sup>. In the present study, most respondents agreed (78%) to using brace treatment and 73% used brace for 22 hours.

### Study Limitations

The main limitation of this study was its small sample size. To reach a more relevant consideration about the preferences of surgeons towards AIS in Turkey, all physicians interested and working in spine diseases should be evaluated. However, it is difficult to conduct such survey, as the present study only aimed to evaluate TSS physicians' preferences towards AIS. As the main study strength, this study is the first to have evaluated preferences of TSS physicians towards AIS treatment.

## CONCLUSION

In light of the study results, TSS physicians agreed on using brace as AIS treatment. However, there was a disagreement towards the indication of the brace treatment. Our results demonstrated a consensus about surgical management and surgical experiences. However, a disparity also existed about the time of allowing activities and contact sports.

### Ethics

**Ethics Committee Approval:** Since our study is a survey study which is evaluated according to the answers doctors who answer the questions, ethics committee approval was not required.

**Informed Consent:** Since our study is a survey study which is evaluated according to the answers doctors who answer the questions, informed consent was not necessary.

**Peer-review:** Internally peer-reviewed.

### Authorship Contributions

Concept: K.T., U.A., Design: K.T., U.A., Data Collection or Processing: G.K.K., İ.Y.Ç., Y.O.K., Y.U., Analysis or Interpretation: G.K.K., İ.Y.Ç., Y.O.K., Y.U., Literature Search: K.T., U.A., İ.Y.Ç., G.K.K., Y.O.K., Y.U., Writing: İ.Y.Ç., Y.O.K., Y.U.

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