

CASE REPORT

A Silver Medal Winner at the 13th World Wu Shu (武术) Championship 2015 17 Months After Selective Thoracic Fusion for Adolescent Idiopathic Scoliosis

A Case Report

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Study Design. Case report.

Objective. To report the successful rehabilitation and the training progress of an elite high performance martial art exponent after selective thoracic fusion for Adolescent Idiopathic Scoliosis (AIS).

Summary of Background Data. Posterior spinal fusion for AIS will result in loss of spinal flexibility. The process of rehabilitation after posterior spinal fusion for AIS remains controversial and there are few reports of return to elite sports performance after posterior spinal fusion for AIS.

Methods. We report a case of a 25-year-old lady who was a national Wu Shu exponent. She was a Taolu (Exhibition) exponent. She underwent Selective Thoracic Fusion (T4 to T12) using alternate level pedicle screw placement augmented with autogenous local bone graft in June 2014. She commenced her training at 3-month postsurgery and the intensity of her training was increased after 6 months postsurgery. We followed her up to 2 years postsurgery and showed no instrumentation failure or loss of correction.

Results. After selective thoracic fusion, her training process consisted of mainly speed training, core strengthening, limb strengthening, and flexibility exercises. At 17 months of post-operation, she participated in 13th World Wu Shu Championship 2015 and won the silver medal.

Conclusion. Return to elite high-performance martial arts sports was possible after selective thoracic fusion for AIS. The accelerated and intensive training regime did not lead to any instrumentation failure and complications.

Key words: Adolescent Idiopathic Scoliosis, instrumentation, martial art, selective thoracic fusion, silver medal, spinal flexibility, sports, Taolu exponent, World Wu Shu Championship 2015, Wu Shu.

Level of Evidence: 2

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Posterior spinal fusion for Adolescent Idiopathic Scoliosis (AIS) will result in loss of spinal flexibility.^{1,2} Spinal flexibility affects sporting performance particularly for competitive athletes. Fabricant *et al*³ reported the level of distal fusion level and Lenke curve types as independent predictors of return to athletic activity (same level or higher) postoperatively. The process of rehabilitation after posterior spinal fusion (PSF) for AIS remains controversial. In a survey of 23 spinal deformity surgeons, 76% of surgeons would allow patients who underwent PSF to return to contact sports by 6 months, and 77% would allow return to collision sports by 1 year after surgery.⁴ However, there have been no previous reports of the rehabilitation process involving an elite high-performance athlete (martial arts exponent) after PSF for AIS. In this case report, we would like to report the training progress of a national Wu Shu exponent which resulted in a triumphant return in the 13th World Wu Shu Championship, 17 months after selective thoracic fusion for AIS.⁵

CASE REPORT

This patient was a 25-year-old lady who was a national Wu Shu exponent. She was a Taolu (Exhibition) exponent. She and her partner competed in the “Duilian” (dual demonstrative combat event) competition segment. She presented to us with AIS in early 2014. She was diagnosed with AIS since the age of 12-year old and noted progressive worsening

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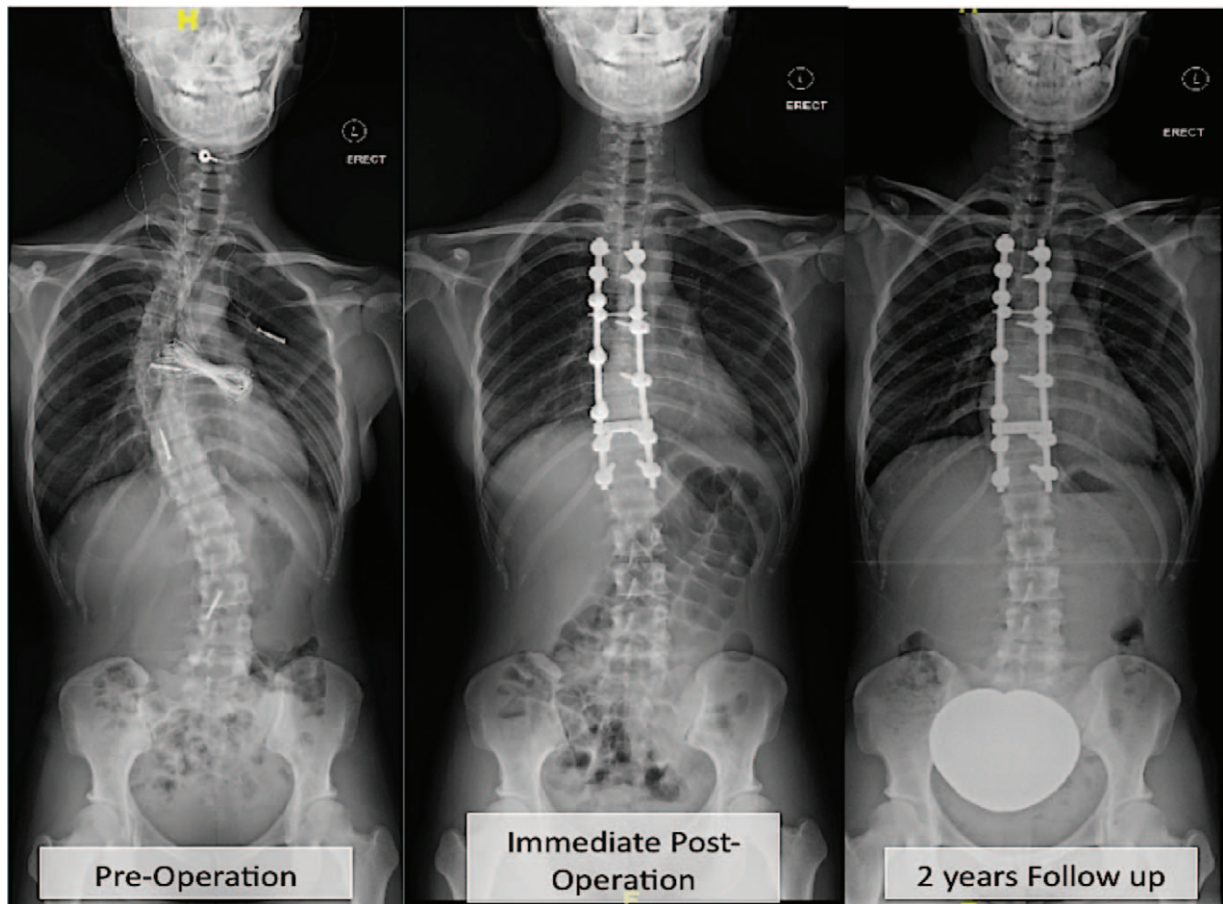


Figure 1. Preoperation, immediate postoperation, and 2 years postoperation radiographs showing no loss of correction or instrumentation failure.

of the curve over time. Whole spine erect radiograph showed a Lenke 1BN curve with a Cobb angle measurement of 55° (T4–T11) (Figure 1). Before the surgery she had reiterated her wish to return to competing at the international level. She underwent selective thoracic fusion using alternate level pedicle screw placement augmented with autogenous local

bone graft in June 2014. The upper instrumented vertebra was T4 and the lower instrumented vertebra was T12. Computed tomography scan performed at 4 1/2 months postsurgery showed spinal fusion (Figure 2). Her training process consisted of mainly speed training, core strengthening, limb strengthening, and flexibility exercises (Figure 3).

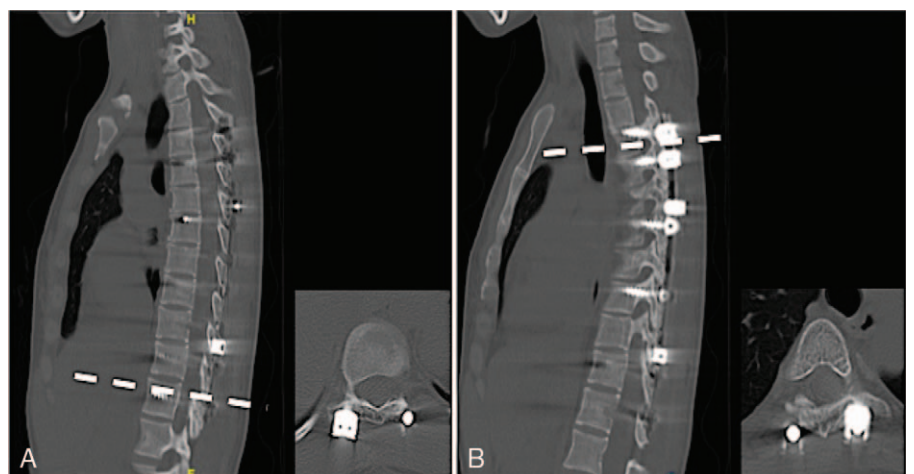


Figure 2. CT scans at 4 1/2 months postoperation showing fusion at the proximal and distal anchor site. CT indicates computed tomography.

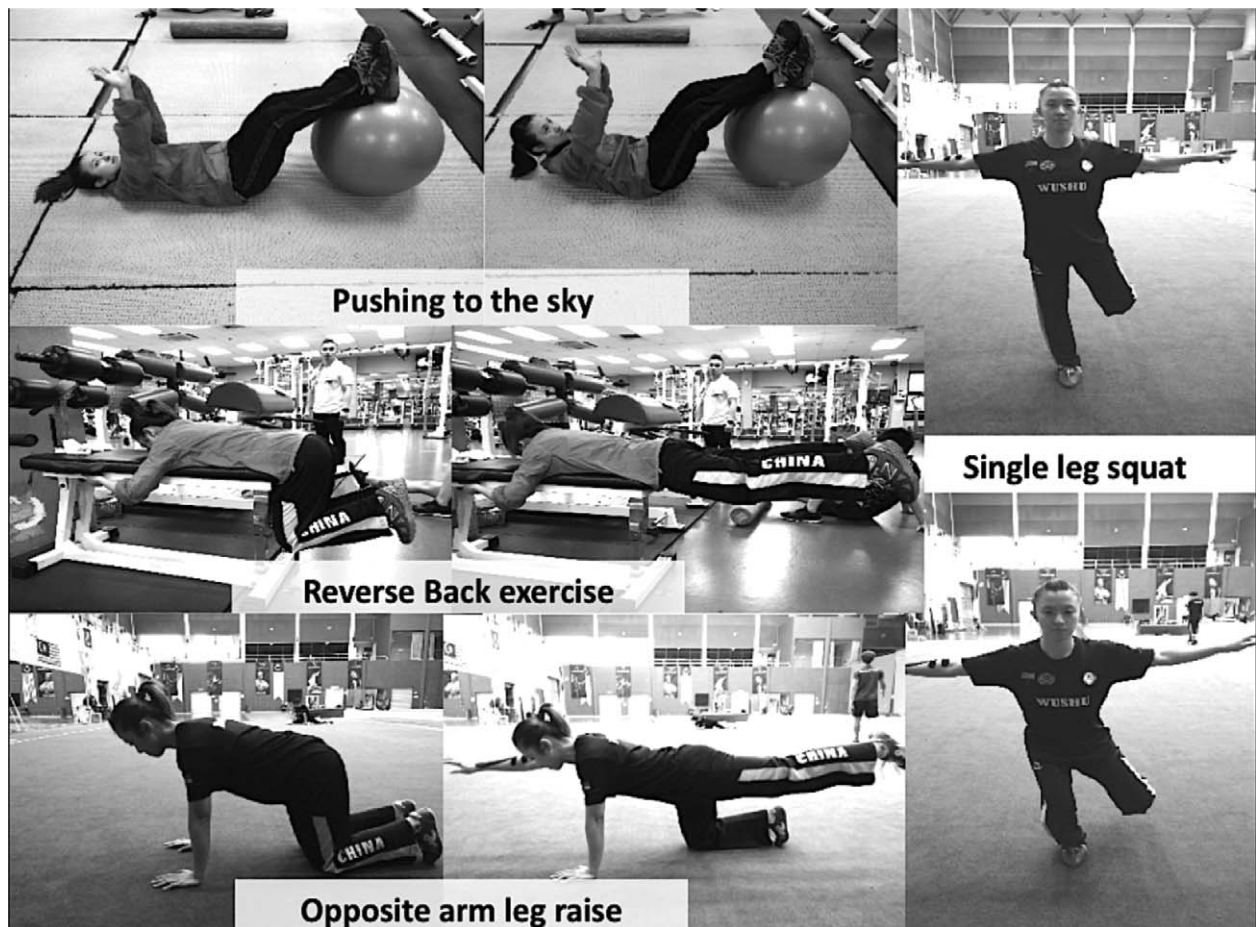


Figure 3. Illustration of the core strengthening and balance exercises which was performed by the athlete from 3 month onward.

Her training process consisted of mainly speed training, core strengthening, limb strengthening, and flexibility exercises (Figure 3). Her detailed training regime is shown in Table 1. She commenced her training at 3 months postsurgery and the intensity of her training was increased after 6 months postsurgery. She began participating in local competitions at 12 months postsurgery. At 17 months of postoperation, she participated in 13th World Wu Shu Championship 2015 and won the silver medal (Figure 4). Follow-up at 2 years postoperation did not show any loss of correction of implant loosening/failure.

DISCUSSION

Wu Shu (武术) is a traditional Chinese martial arts sport that combines common kung fu moves like punches, kicks, sweeps, and throws with acrobatic moves, which require balance and flexibility. In the Taolu segment, it is an exhibition sports and therefore can be considered a mixed contact/collision sports. Artioli *et al*⁶ studied the Brazilian Olympic Wu Shu team and found that the athletes required high amount of flexibility, leg power, lumbar isometric strength, and moderate mean and peak arm power.

The athlete above was a national Wu Shu exponent who competed in the “Duilian” segment, which was a dual exhibition combat competition. This posed us a management dilemma, as there was no guide to the rehabilitation process of an elite athlete who had undergone PSF for AIS. To date, there have been no reports of catastrophic failure of instrumentation after return to sports after PSF. Rubery and Bradford conducted a survey among surgeons who were Scoliosis Research Society members. Sixty percent of surgeons prohibited collision sports and 13% recommended against contact sports after surgery. Twenty percent allowed return to contact sports at 6 months and 61% allowed return to contact sports at 1 year. Distal fusion level was an important factor for 44% of respondents.⁷ Lehman *et al* in another survey of 23 deformity surgeons found that the type of instrumentation was an important factor in the decision to allow patients to return to sports. They also found that 35% of surgeons responded that the level of LIV did not matter, whereas 43% responded that fusion to L4 would preclude return. Forty-one percent of surgeons would not recommend operation if the athlete wished to return to collision sports the season after the surgery.⁴

TABLE 1. The Training Regime Which the Athlete Underwent From 3 Months Onward

	Description of Exercises	3 Month Postoperation	4 Months Postoperation	5 Months Postoperation	From 6th Month Onward
Speed	Walking	45 min	45 min	—	—
	Slow Jog	—	—	90 min	—
	Brisk Jog	—	—	—	90 min
Core strength	Sit ups	5 reps (8 sets)	—	—	—
	Pushing to the sky	8 reps (8 sets)	—	15 reps (10 sets)	15 reps (10 sets)
	Reverse back exercise	8 reps (8 sets)	—	—	—
	Reaching for the knees	—	20 reps (8 sets)	—	—
	Bridge (with fitness ball)	—	—	10 s × 3 reps (10 sets)	—
	Bridge	—	—	1 min × 12 reps	—
Limb strength	Squats (with back supported)	—	1 min × 10 reps	45 s × 10 reps	—
	Squats (with fitness ball)	—	—	10 reps (10 sets)	—
Balance	Single leg balance + squat	5 times × 8 sets	—	—	—
	Opposite arm-leg raise	—	10 reps (10 sets)	—	—
	Single leg balance (on fitness ball) + shoulder press	—	—	—	5 s × 5 reps (10 sets/side)
Flexibility	Face to chest position	20 s hold (3 sets)	20 s hold (3 sets)	20 s hold (3 sets)	20 s hold (3 sets)
	Fingers to toes stretch (sitting)	20 s hold (3 sets)	20 s hold (3 sets)	20 s hold (3 sets)	20 s hold (3 sets)
Others	Latissimus pull	25 s hold (8 sets)	30 s hold (5sets)	—	25 s hold (8 sets)
	Finger climb	—	10 reps (8 sets)	10 reps (8 sets)	10 reps (10 sets)

However, in these studies, the level of competition was not considered.

The closest example to the case reported above was Stacy Lewis.⁸ However, in her case, she was operated at a younger age and started competing at a highest level of competition many years after the scoliosis corrective surgery. This case

illustrates that after selective thoracic fusion, the training progress of a competitive athlete could be accelerated as shown in the regime above. This would also serve to inspire other elite athletes who suffer from AIS and argue against the myth that a career in competitive sports is not possible after PSF for AIS. In selective thoracic fusion in particular,



Figure 4. An example of the poses in Wu Shu and the medal award ceremony at the 13th World Wu Shu Championship 2015.

the lumbar flexibility was still preserved, and therefore motion in the spine would be almost normal.

We conclude that return to elite high-performance martial arts sports was possible after selective thoracic fusion for AIS. The accelerated and intensive training regime did not lead to any instrumentation failure and complications.

➤ Key Points

- ❑ Return to elite sports performance after posterior spinal fusion for AIS is challenging due to loss of spinal flexibility.
- ❑ We report a case of a 25-year-old lady who was a national Wu Shu exponent. She underwent selective thoracic fusion (T₄–T₁₂) and commenced intensive training 3 months after surgery.
- ❑ At 17 months postsurgery, she participated in 13th World Wu Shu Championship 2015 and won the silver medal. Follow-up at 2 years postoperation did not show any loss of correction of implant loosening/failure.

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